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GRANULAR AGGREGATE RESOURCES OF NEWCASTLE (21 I/13) DOAKTOWN (21 J/9) AND McKENDRICK LAKE (21 J/16)

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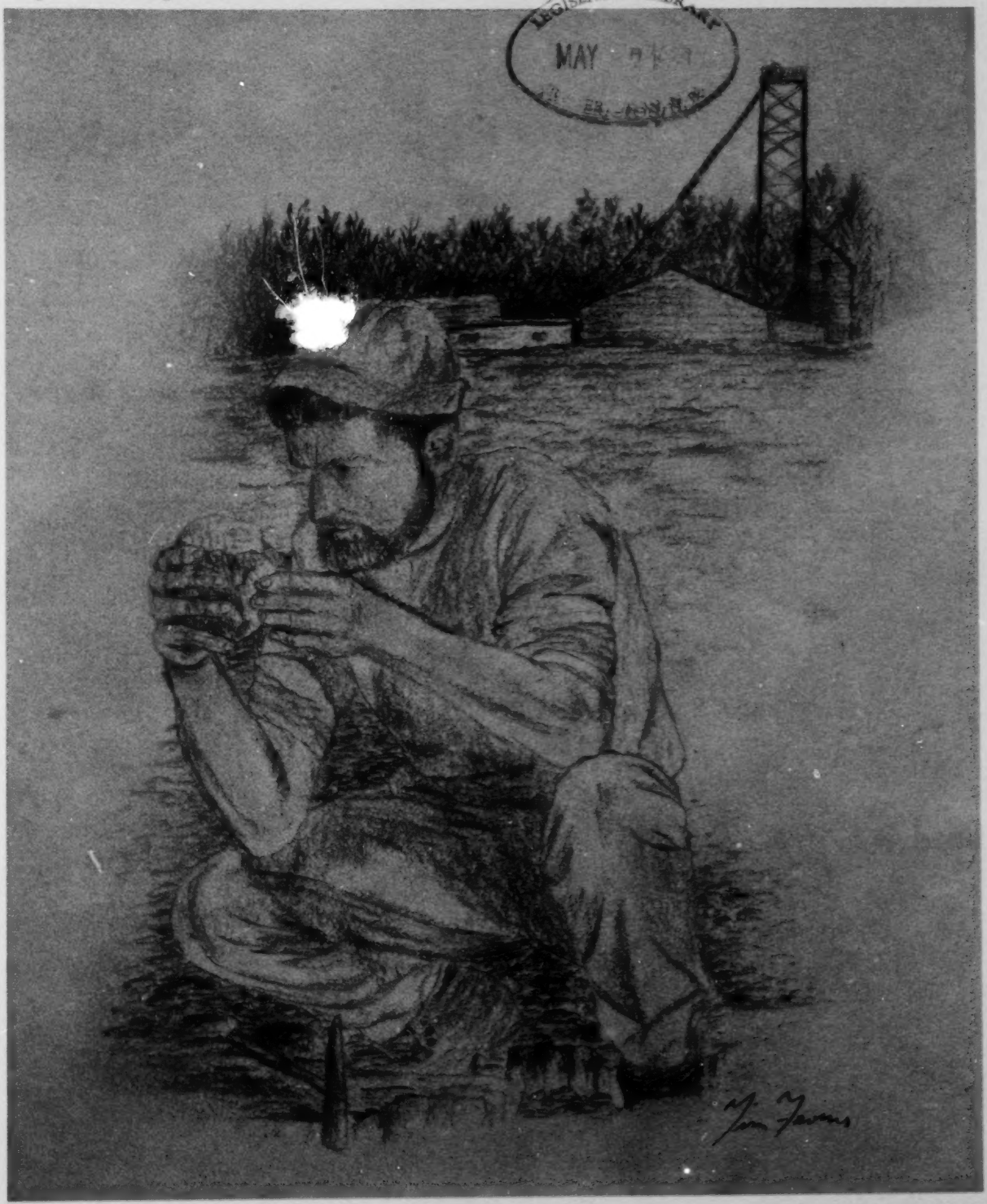

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GRANULAR AGGREGATE RESOURCES
OF
NEWCASTLE (21 I/13), DOAKTOWN (21 J/9)
AND McKENDRICK LAKE (21 J/16)

Mineral Resources Division
Department of Natural Resources
New Brunswick

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Mineral Resources Division
Department of Natural Resources
P. O. Box 6000, Fredericton, N.B.
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Report No.: Open File Report 82-3

Authors: Claire Lavergne; Marilynn Hunter (Geocon Inc.)

Cover: Tim Fevens

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ABSTRACT

This report provides an inventory and evaluation of the distribution, extent, thickness and quality characteristics of granular aggregate deposits in the map-area covered by three 1:50,000 N.T.S. mapsheets: Newcastle (21 I/13), Doaktown (21 J/9) and McKendrick Lake (21 J/16). Units of granular materials were mapped and comments made as to their origin. Sampling was carried out to determine the quality of the materials and estimates of recoverable reserves were calculated for most of the aggregate sources.

Glaciofluvial deposits are the main sources of granular aggregate with estimated recoverable reserves of 46.4×10^6 m^3. These materials are found in an outwash plain traversed by Highway 420 between the Renous and Little Southwest Miramichi Rivers, in terraces along the Renous River and near the confluence of the Northwest and Little Southwest Miramichi Rivers, and in a terrace remnant in National Defense land south of Renous. Other significant sources of granular material are found in two ice-contact deposits, the Bartholomew and Devil's Back eskers with total estimated recoverable reserves of 18.3×10^6 m^3.

RÉSUMÉ

Ce rapport décrit la nature, l'étendue, l'épaisseur et la qualité des dépôts granulaires de la région couverte par trois cartes du Système Topogrphique National, à une échelle de 1:50,000: Newcastle (21 I/13), Doaktown (21 J/9) et McKendrick Lake (21 J/16). Les unités de dépôts granulaires ont été cartographiées selon leur mode de déposition. L'échantillonage a permis de déterminer la qualité des dépôts. Une évaluation des quantités exploitables a été faite pour la plupart des sources d'agrégat.

Les dépôts fluvioglaciaires représentent la principale source d'agrégat de cette région: les réserves ont été évaluées à 46.4 x 10^6 m^3. On les retrouve dans une plaine d'épandage traversée par le route 420 entre les rivières Renous et Little Southwest Miramichi et dans une terrasse remaniée située sur une propriété du Ministère de la Défense Nationale au sud de Renous. Deux autres dépôts importants, (de contact glaciaire cette fois), les eskers Bartholomew et Devil's Back, possèdent des réserves évaluées à 18.3 x 10^6 m^3.

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C. Lavergne
M. Hunter

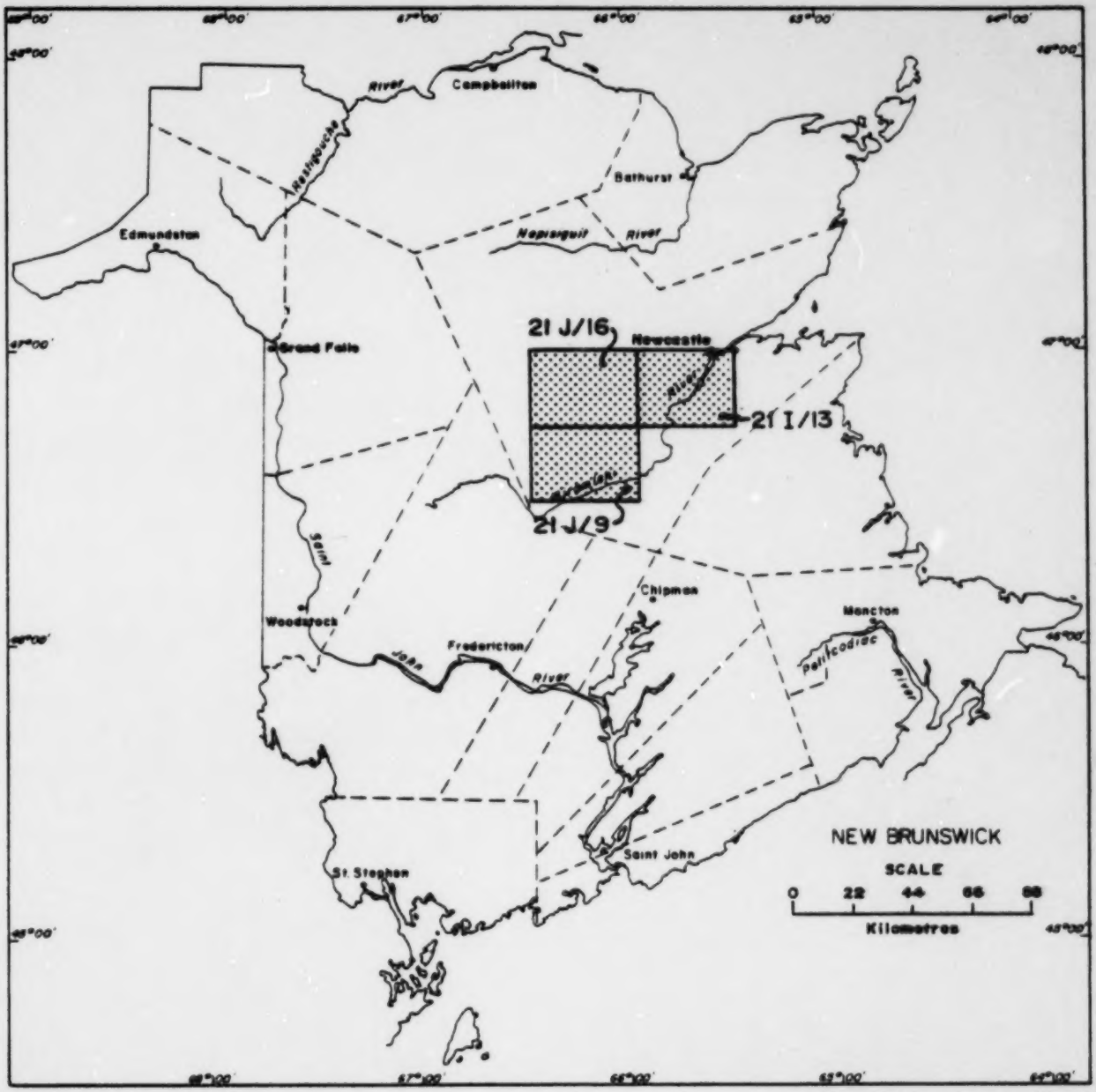

Figure 1
Location Of Study Area

INTRODUCTION

1.1 Location

The study area is located in central eastern New Brunswick (Figure 1), covering 3200 km^2. The town of Newcastle is the major population center.

Mapping was carried out at a scale of 1:50,000 using three N.T.S. mapsheets: Newcastle (21 I/13), McKendrick Lake (21 J/16) and Doaktown (21 J/9).

1.2 Access

Two main highways cross the map-area: the Fredericton - Newcastle Highway 8 and the Renous Highway 108.

The Newcastle mapsheet has a fairly well developed network of secondary paved roads (420, 425, 126, 118). A few all-weather gravel roads complete its coverage.

The McKendrick Lake and Doaktown mapsheets are serviced by gravel forest access roads. Coverage of the area is completed by old logging roads. Old, partially overgrown roads made for difficult access south of the Bartholomew River.

1.3 Present Study

Geocon Inc. was retained by the Mineral Resources Division of the New Brunswick Department of Natural Resources to carry out a granular aggregate resource inventory of the Newcastle, McKendrick Lake and Doaktown mapsheets as part of a province-wide survey program.

The aim of this study is to provide basic information on the distribution, extent, thickness and quality characteristics of granular

aggregate deposits in the map-area. Previously published information was consulted and unpublished information was obtained from the Mineral Resources Division, the New Brunswick Department of Transportation and the Water Resources Branch of the provincial Department of the Environment. Field work involved examination of natural and man-made exposures and was supplemented by aerial photograph interpretation. Reserve estimates are based on field observations.

1.4 Duration of Study

Field investigations for this map-area were conducted during the month of September, 1981 as part of a larger contract covering four study areas totalling twelve mapsheets. The field program for all four areas was carried out by two field teams of two personnel each from mid-summer to early fall. Laboratory and office studies involved in the preparation of these reports were undertaken concurrently during the fall of 1981.

1.5 Previous Work

Early references to the surficial geology of the area were made by Chalmers (1889) around the turn of the century. More recent work carried out by other individuals in nearby map-areas deals with the glacial history in a more modern context. Rampton and Paradis (1981a, 1981b) have prepared reports and maps of a revised Quaternary geology which covers the study area at a scale of 1:250,000.

Hamilton (1973) compiled a map showing the granular aggregate resources in New Brunswick. Since then, as part of an ongoing province-wide survey, granular aggregate inventories have been completed in some neighbouring map-areas at a scale of 1:50,000. (Brinsmead, 1978)

Bedrock geology mentioned in this report was obtained from the provincial bedrock maps compiled by Potter et. al. (1979).

PHYSIOGRAPHY

2.1 Topography

The study area lies within two divisions of the Appalachian physiographic region (figure 2): the Maritime Plain and the New Brunswick Highlands (Bostock 1970).

The Maritime Plain is a low and flat-lying terrain. Maximum elevations range from 75-90 m a.s.l. in the north and 135-150 m a.s.l. in the south.

Within this map-area, the New Brunswick Highlands consist of high broad ridges with a local relief of 90-150 m. The Highlands rise gently towards the west from elevations of 90-135 m a.s.l. to 305 m a.s.l. in the Doaktown map-area and to a maximum of 460 m a.s.l. in the northwest corner of the McKendrick Lake map-area.

2.2 Drainage

Drainage is generally good in the Highlands due to the relief; however local areas show some derangement. The Maritime Plain is only poorly to moderately drained, a result of low relief and Wisconsinan events.

The Southwest Miramichi River and its tributaries, the Little Southwest Miramichi, Renous, Dungarvon, Bartholomew and Barnaby Rivers drain the map-area. Within the Maritime Plain, the Dungarvon and Bartholomew Rivers define a parallel drainage pattern.

2.3 Bedrock Geology

A geological map of New Brunswick has been compiled in 1978 by Potter, Hamilton and Davies. The authors indicate that the Maritime Plain is underlain by Pennsylvanian sedimentary rocks. The flanks of the Miramichi Highlands in the study area consists mainly of Silurian sedimentary rocks

with minor Mississippian and/or Pennsylvanian sedimentary rocks (red to grey conglomerate, siltstone) and Silurian volcanic rocks. The core of the Highlands (northwest half of the McKendrick Lake map-area) is made up mainly of Ordovician argillaceous sedimentary rocks, greywacke, quartzite, and conglomerate. Some Devonian igneous rocks are present in the areas around Camp Brook and North Pole Stream.

2.4 Glacial Geology

During the late Wisconsin, ice probably covered all of New Brunswick. Central eastern New Brunswick has been affected by glacial ice from two sources: (1) ice originating in the west, and (2) local ice centres of accumulation in the Maritime Plain - the Gaspereau ice centre (Rampton and Paradis, 1981a, 1981b). Several phases of late Wisconsin glaciation have been recognized and contribute to the complex glacial history. This has been discussed more fully in Quaternary and surficial geology reports covering the map-area. (Brinsmead, 1978; Rampton-Paradis, 1981)

Evidence of earlier glaciations has been found to the east of the map-area (Prest, 1973). The most recent events are of the greatest significance however, since they are responsible for the present day character and distribution of landforms and surficial materials. Most of the surficial materials in central eastern New Brunswick consist of glacial drift which is deposited (1) directly as a result of glacial activity, and includes various types of moraine (basal and ablation till), and (2) by the action of meltwaters which includes stratified drift (ice-contact and glaciofluvial outwash). Some of the glaciofluvial outwash deposits in the Newcastle mapsheet are possibly galciomarine in origin due to a rise in the marine limit during degalciation (Rampton and Paradis, 1981b). Postglacial erosion of glacial drift has resulted in the formation of alluvial deposits (floodplains and terraces) along most streams. Of interest to this study was the nature and extent of materials suitable for aggregate sources. Meltwater deposits are considered to be the best sources of this commodity although other drift deposits and shattered and weathered bedrock have been utilized where the former were not available or is in short supply.

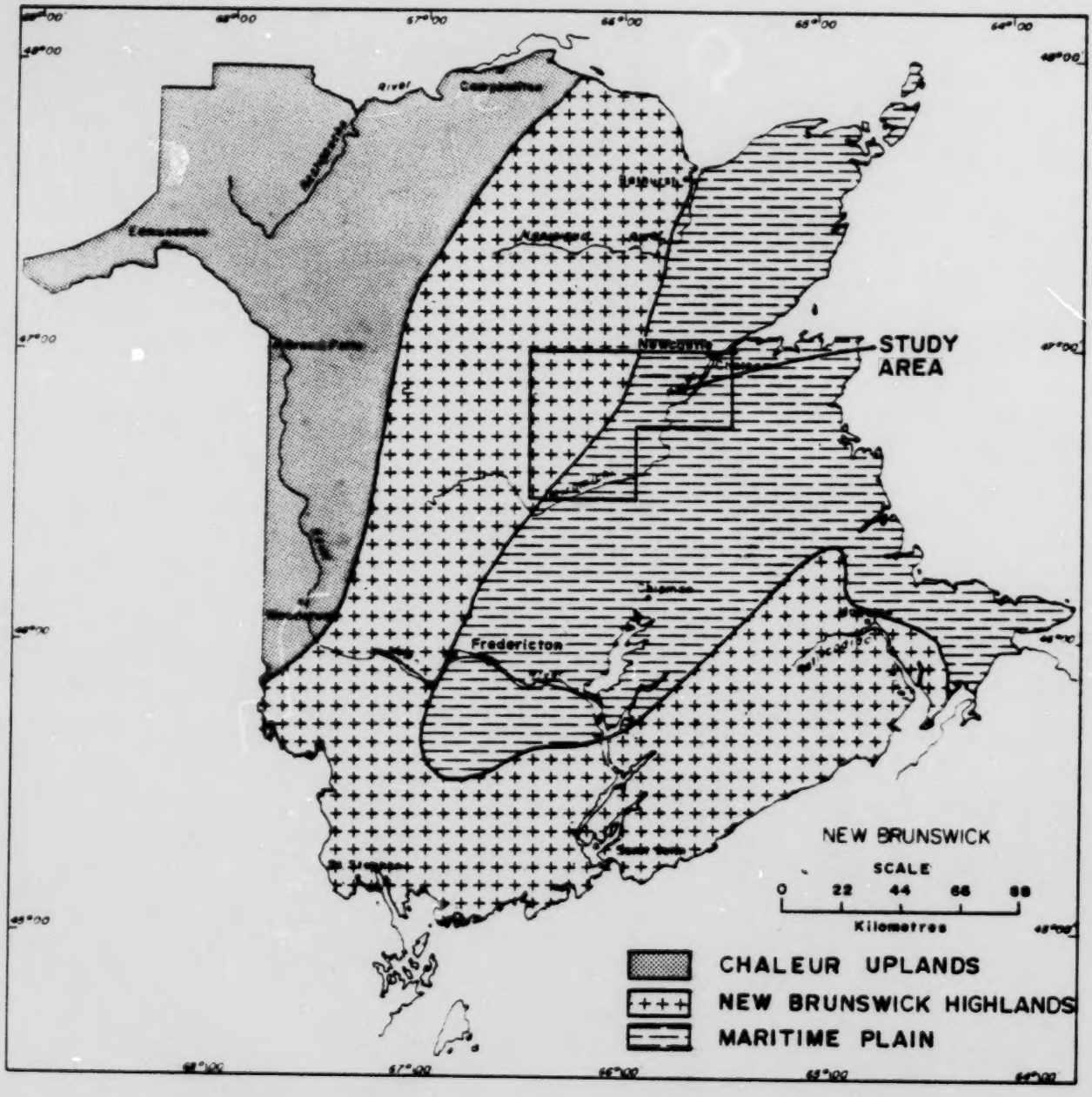

Figure 2

Physiographic Subdivisions Of New Brunswick

AGGREGATE RESOURCES

3.1 Classification of Materials

Unconsolidated materials are initially separated according to their origin or the way in which they are formed. They may then be subdivided according to their characteristics such as texture, surface expression and modifying processes. In this report, granular materials have been presented in such a way as to reflect their origin or mode of formation and their texture.

Four genetic materials have been identified as potential sources of granular aggregate. They are (1) alluvium, (2) glaciofluvial deposits, (3) ice-contact deposits, and (4) ablation till. These are described more fully in the following section (3.2).

Texture refers to the size, roundness and sorting of particles in unconsolidated sediments. Roundness and sorting are self-explanatory. Particle size distribution is based on a slightly modified version of the Unified Soil Classification System. The following table provides the details.

General Term	Specific Term	Particle Diameter	Sieve Sizes
Fines	Clay	Less than 0.002 mm	--
	Silt	0.002 to 0.075 mm	0.002 mm to #200
Sand	Sand	0.075 to 4.75 mm	#200 to #4
Gravel	Pebbles	4.75 to 75 mm	#4 to 75 mm
	Cobbles	75 to 200 mm	75 mm to 200 mm
	Boulders	Larger than 200 mm	Over 200 mm

3.2 Description of Materials and Aggregate Production Potential

3.21 Alluvium

Alluvial materials are transported and deposited by streams and rivers. Sediment is transported in two ways. Fine sand, silt and clay particles are carried in suspension while sand, pebbles and larger clasts are rolled and bounced along the river bed. Deposition occurs when the sediment load exceeds the transport capability of the flowing water. This commonly occurs where there is a decrease in stream gradient or where a constricted channel emerges into an unconstricted relatively broad area.

Alluvial materials consist of well sorted and bedded gravel, sand, and silt. Particle size may range up to cobbles; clasts are generally rounded. Alluvial deposits are easily recognized by their well-defined bedding and stratification, often consisting of alternating beds of relatively finer and coarser material. In general, texture of alluvial sediments will vary with the gradient of the depositing stream. Coarse gravels occur along steep mountain streams; fine gravels, sands and silts occur along low gradient channels.

Alluvial sediments are found on the floodplains and terraces of present day streams and rivers. Floodplains are not included on the maps as they, by definition, show some evidence or likelihood of periodic flooding. The high water table would, in any case, severely limit exploitation. The alluvial terraces along major rivers in the map-area are generally quite low; gravel pits located in them have been abandoned. Other terraces exist along small streams which are, at present, mostly inaccessible. An estimated total of 15.9×10^6 m^3 of potential granular reserves is present in the alluvium within the map-area. Fluctuating water tables might reduce this figure somewhat.

3.22 Glaciofluvial outwash deposits

Glaciofluvial outwash materials are transported and deposited by streams and rivers directly in front of glacial ice. They differ from their

3.23 Ice-contact deposits

Ice-contact materials are transported and deposited by meltwater streams in contact with glacial ice. Rapid fluctuations in discharge and sediment load of meltwater streams and changing positions of ice margins result in an unstable depositional environment. Sediments deposited in contact with a glacier tend to slump and slide as supporting ice melts, resulting in irregular surfaces on landforms, and faults and distorted bedding with the materials.

Ice-contact sediments consist of sorted and non-sorted, bedded and massive materials that range in texture from silt and fine sand deposited under low flow conditions to cobble-boulder beds resulting from major floods. Abrupt variations in texture are typical. Lenses or pockets of silt may be present where meltwater was locally ponded. Layers or pockets of flow till resulting from saturated supraglacial debris sliding off the ice may be included in the materials. Very clean materials may be found adjacent to very dirty materials.

Ice-contact sediments are found in a variety of topographic forms, the more easily recognizable being kames, kame terraces and eskers.

Kames are conical mounds or small hills of sand and gravel with a local relief of 2 meters to several tens of meters. They form where meltwater sediments are deposited in depressions of the ice surface and later melt out to form chaotically arranged hills and hollows. Kames may be single or grouped (eg. J16-24).

Kame terraces form when glaciofluvial sediments are deposited between the glacial ice and an adjacent hillside. Steep ice-contact scarps develop as the ice recedes and leaves the outer edge of the terrace without any lateral support. Collapse and slumping occurs along this scarp and melting of buried ice produces an irregular terrace surface. J9-39 describes such a deposit.

Eskers are sinuous, steep-sided ridges of sand and gravel formed by the melting out of sediment-choked tunnels of subglacial streams. Their length

varies from several tens of metres to many kilometres; their height ranges from a few metres to 20 to 30 metres. The main source of ice-contact material in the map-area is found in two eskers, the Bartholomew complex (J9-33) and the Devil's Back (J9-03).

Total estimated reserves of ice-contact materials are 21.6 x 10^6 m^3. Most of this comes from the Bartholomew and Devil's Back eskers. This material is suitable only for borrow in the pit run state; however quality could be improved with processing in some cases.

3.24 Ablation till

Ablation till is formed during deglaciation. As the ice melts, debris on the surface slumps and slides back and forth eventually to be deposited as irregular hummocks and ridges or as a blanket overlying basal till. Hummocky and ridged ablation till can be difficult to distinguish from ice-contact granular materials; blankets can only be recognized by ground observation of exposed sections. Ablation till is commonly found where large ice masses have stagnated in situ.

Ablation till is typically a loose, non-sorted, non-stratified sandy, silty gravel. Fines may be selectively washed out during deposition. Pockets of stratified silts, sands and/or gravels as well as very large boulders may be present within the deposit.

There are no sizeable deposits of ablation till in this map-area. Generally, these materials are poor sources of granular aggregate, used only for local borrow purposes, and as such are not considered in this report as an aggregate source unless presently exploited.

3.25 Other sources of aggregate

Southeast of the main Southwest Miramichi River there is a paucity of granular materials. Consequently, broken and shattered bedrock is commonly used for borrow and fill. A list of these locations can be found in Appendix 2.

3.3 Field and Laboratory Methods

Information used in the determination of deposit boundaries and thicknesses was obtained by the examination of all natural and man-made exposures that were encountered while driving all the passable roads within the map-area and was supplemented by aerial photograph interpretation. Many of the exposures were improved by a little shovel work; some had to be dug to expose even a small section. Observation of granular materials at depth was restricted to pit excavations and a few natural cuts, limiting the accuracy of thickness estimates.

Deposit boundaries were determined by field observations where possible and by aerial photograph interpretation. Average material depths used in the calculations of reserves were obtained by modifying, if necessary, the observed depths, taking into account geologic and topographic considerations and air photograph observations of the deposit beyond excavation boundaries. Airphotos at a scale of 1:20,000 were used in the field and later in the office during the preparation of the maps and report.

Samples of granular materials were taken from the best exposures available in partially exploited and unused deposits. Care was taken to obtain samples that were as representative of the deposit as possible. Where notable variation was present within a particular deposit, more than one sample was taken (when feasible) to illustrate this.

For practical purposes, deposits with significant cobble and/or boulder content were sampled by deliberately excluding these large clasts and estimating their number as a percentage of the total exposed face. The mechanical analyses of these samples would therefore represent the particle size distribution of the finer fractions (less than 75 mm) and should be used with the percentage estimates given in the field notes.

Mechanical and lithological analyses were conducted in the lab during the fall of 1981. For the mechanical analyses, samples were dried, split, sieved, and the results weighed. Approximately one hundred of the largest

pebbles (20 to 50 mm in size) were used for each of the lithologic analyses. Clasts were subjected to a qualitative "failure- under-impact" test. Clasts that broke were considered unsound and the remainder were considered sound. Lithotype of each pebble was noted. Since this procedure does not conform to any standard tests used by aggregate producers, the material should be tested using conventional methods for soundness and abrasion if it is desirable and otherwise suitable for high specification use.

In addition to field observations and laboratory analyses, Department of Transportation aggregate test reports and Water Resources water well records were consulted for any additional information, re: sand and gravel. Department of Transportation data has been entered in the sample descriptions where there was positive correlation of sites. Water well locations have been plotted on the accompanying maps where drill logs have indicated an intersection with sand and/or gravel. The serial numbers of the locations are noted for future reference.

3.4 Reserve Calculations

Deposit boundaries are shown as approximate and inferred, depending on the availability of adequate evidence to substantiate airphoto interpretations. Reserve calculations based on inferred boundaries should be regarded with a lesser degree of confidence than if the boundaries are approximate.

Similarly, the reliability of the material thickness information will affect the degree of confidence in the reserve figures. Where good exposures of well-defined deposits were observed, thickness data is considerably more dependable than a poorly exposed section of a deposit with indistinct boundaries.

In general, both thickness and deposit area figures have been kept conservative in making reserve calculations. In addition, reserve figures have been further reduced, somewhat qualitatively, because recoverable

alluvial counterpart in their variability, a consequence of their depositional environment. Typically a proglacial environment is unstable due to rapid fluctuations in discharge and sediment load of meltwater streams and changing positions of the ice front.

Glaciofluvial materials consist of well to poorly sorted, bedded to massive sediments that range in texture from silt and fine sand deposited under low flow conditions, to massive cobble-boulder beds resulting from major floods. Variations of texture are typical. Gravels generally contain a sandy matrix but the presence of washed-in silt is also common. Occasional catastrophic events caused by the outbursts of ice-dammed lakes may result in deposition of much heterogeneous material.

Glaciofluvial sediments are found as outwash deposits and as ice contact deposits laid down by meltwater streams that drained away from the ice margin and as blankets within large meltwater channels cut in a different substrate. Outwash may form broad gently sloping plains in areas of low local relief; in valleys it may have been dissected to form terraces which overlook the younger alluvial deposits. Outwash plains can be seen along Highway 420 between the Renous and Little Southwest Miramichi Rivers (J16-11, 20). Extensive terrace deposits can be seen in the confluence area of the Northwest and Little Southwest Miramichi Rivers (I13,-57, 58, 59, 60, 61). Some terraces along the Renous River have active pits located in them (I13-30, 31).

Large meltwater channels are formed by erosion from streams draining from and alongside the ice margins. They may presently contain a good-sized river, a small misfit stream within the confines of the old channel or a chain of swamps and bogs. Glaciofluvial materials in these channels are often widespread but thin. One such channel is located along the lower Dungarvon River.

Reserve estimates for the three mapsheets are 25.7×10^6 m^3 (Newcastle), 5.0×10^6 m^3 (Doaktown) and 15.7×10^6 m^3 (McKendrick Lake) totalling 46.4×10^6 m^3 of potential granular aggregate of glaciofluvial origin. Much of this material is suitable only for borrow in the pit run state; however quality could be improved with screening and washing in many cases.

reserves are usually less than reserves calculated on a strict "area x thickness" basis. This has been reflected in a reduced average thickness for the deposit.

It must be stressed at this point that the lateral and vertical extent of any deposit is at best an educated guess based on airphoto examination and first hand appraisal of the deposit. Therefore prior to any exploitation consideration is required for a detailed examination for qualitative and quantitative evaluation with respect to a specific end use.

3.5 Quality Limitations

The quality of granular aggregate deposits for high specification use is affected by three major factors: texture, clast lithotypes, and alkali-reactivity.

(1) Texture:

A high content of fine particles (smaller than the 200-mesh sieve) renders a potential aggregate material unsuitable for high specification uses in the pit run state. Washing could lower the fines content to an acceptable level; however, any processing will increase the cost of exploitation.

An excess of coarse material (cobbles and boulders) can pose operational problems but will not necessarily affect the quality of the deposit. Removal of the "oversize" clasts and the alternative of crushing them are both costly procedures. Crushing, however, might produce a higher grade of aggregate.

In general, a uniform well-graded deposit with few fines and few "oversize" clasts is desirable for most general uses.

(2) Clast Lithotypes:

High specification aggregate should be hard, strong, uncoated, and resistant to both physical and chemical weathering. The lithologic analyses

recorded in Appendix 1 have grouped the lithotypes into sound and unsound classes.

There are several ways of assessing the soundness of a lithotype. Detailed petrographic analysis, the magnesium sulphate soundness test and the Los Angeles abrasion loss test are the most common for testing the overall quality of an aggregate. Details for these and other tests are specified by the American Society for Testing and Materials (A.S.T.M.). Methods used in this study are described in section 3.3.

In general, high quality rocks include diabase, granite, gabbro, hard gneiss, basalt, andesite and greywacke and fair quality rocks include conglomerate, schist and limestone/dolomite. Poor quality rocks usually include argillite, chert, phyllite, slate, soft sandstone, and volcanic tuff. Some discrepancies were observed between this listing and the results of tests performed in this study, but can be explained by the excessive weathering and friability of some of the clasts (e.g. weathered granites).

Very often, the quality of aggregate within a deposit will be closely related to the underlying bedrock type. In areas where poorly indurated sedimentary and low grade metamorphic rocks occur, the materials are more likely to have a higher percentage of unsound lithotypes than areas where the deposits are underlain by intrusives and volcanic rocks.

(3) Alkali-reactivity:

Although no specific testing for alkali-reactivity was performed on the samples taken, it is generally known that certain lithotypes will react with the alkalis in portland cement, resulting in expansion and cracking of the concrete. Lithotypes which are potentially reactive include felsic extrusives, quartzite and chert.

The use of aggregate having high percentages of potentially reactive lithotypes is cautioned. In cases of suspected reactivity, the use of low-alkali portland cement or the partial substitution of fly-ash in place of portland cement serves as a solution to the problem (Swenson, 1973).

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APPENDIX 1

SAMPLE DESCRIPTIONS
of
NEWCASTLE (21 I/13), DOAKTOWN (21 J/9)
and McKENDRICK LAKE (21 J/16)

Note: The Location Numbers Not Referred to in Appendix 1 Refer to Bedrock Exposures Listed in Appendix 2

* Subsequent review of the lithological Analysis indicates there may be a confusion of fine grained Basic Igneous lithotypes with Greywacke

Location #: I13-01 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Nelson

Exposure Type: Gravel pit NTS: 21 I/13

Status: Abandoned UTM: 878796

Section Description & Comments:

Approximately 2 to 3 m of cross-bedded, interfingered, fine to medium sand with cobbly pebbly medium sand are exposed. Clasts are subangular and mainly flat. A variable content of gravel brings it to a sandy gravel in places. Occasional boulders are seen on the slumped portion of the exposure.

There is a pond in the pit floor. Recoverable reserves are limited in depth by that factor.

This deposit has been intensely worked. According to D.O.T. it is now nearing depletion. This refers to the property in which the pit is located. Conflicting land use may render the remainder of the deposit unavailable for extraction.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	94.3	88.0	83.5	73.4	67.4	64.2	54.8	28.8	6.7	1.7	0.9

Lithologic Analysis:

Unsound Lithotypes (%)		Sound Lithotypes (%)	
Sandstone	26	Basic Igneous*	32
Acid Igneous	2	Metasediment	14
		Acid Igneous	12
		Sandstone	12
		Quartzite	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
150	100	2-3	2,000,000

Location #: I13-03 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Nelson

Exposure Type: Borrow pit NTS: 21 I/13

Status: Active on demand UTM: 011979

Section Description & Comments:

0 - 0.6 m Poorly sorted, interstratified pebbly medium sand and medium sand.
0.6 - 1.0 m Oxidized medium sand.
1.0 - 2.5 m Medium sand, slightly silty.

This is possibly a very extensive deposit of marine origin. Recoverable reserves are limited because of the high water table and the minimal thickness of the deposit.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis:

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		1.5-2	Limited

Location #: I13-04 County: Northumberland

Type of Deposit: Glaciofluvial blanket Parish: Nelson

Exposure Type: Borrow Pit NTS: 21 I/13

Status: Abandoned UTM: 016985

Section Description & Comments:

A thickness of 1.7 m of massive, light beige, fine sand is exposed. The water table appears to be high.

D.O.T. data (1962) indicate that the deposit could make an effective filter for a soil or could be used as asphalt sand.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											
D.O.T. 1962					100			85.8			2.1

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		1.5	

Location #: I13-12

County: Northumberland

Type of Deposit: Alluvium

Parish: Nelson

Exposure Type: Borrow pit

NTS: 21 I/13

Status: Abandoned

UTM: 081952

Section Description & Comments:

A thickness of 2.6 m of poorly to moderately sorted, fine sand and sandy pebble gravel. Cobble content represents 2 %. Clasts are sub-rounded to rounded.

The water table is at the pit floor.

This deposit has already been heavily worked.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable

Location #: I13-23 County: Northumberland

Type of Deposit: Alluvium Parish: Derby

Exposure Type: Borrow pit NTS: 21 I/13

Status: Active UTM: 896904

Section Description & Comments:

0 - 0.3 m Soil horizon (overburden).

0.3 - 0.7 m This is a "till-like" horizon. It can be described as a poorly sorted cobbly pebble gravel in a silty sand matrix. The silt distribution of the matrix appears to be uneven, patchy. This unit is well compacted (semi-indurated). Occasional boulders (maximum size 1 m) were noticed. Clasts are subrounded.

0.7 - 2.3 m Interstratified, moderately sorted sandy pebble gravel with medium and very fine sand. Clasts are subrounded to rounded. The maximum cobble size is 21 cm.

Another exposure, 50 m to the south-east shows that same very fine sand overlain by a sandy cobbly pebble gravel.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
7	3	1.5	45,000

Location #: I13-25 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blackville

Exposure Type: Sand pit NTS: 21 I/13

Status: Inactive UTM: 871879

Section Description & Comments:

Approximately 3 m of stratified to laminated, cross-bedded, light beige, fine sand are exposed. Beds are dipping 18° NE.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
24	10	3	200,000

Location #: I13-26 County: Northumberland

Type of Deposit: Glaciofluvial blanket Parish: Blackville

Exposure Type: Garbage dump NTS: 21 I/13

Status: Undeveloped UTM: 877872

Section Description & Comments:

A thickness of 2 m of poorly sorted, cobbly pebble gravel is exposed. Clasts are subrounded. This is a very poor exposure.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
30	25	1	250,000

Location #: I13-27 **County:** Northumberland

Type of Deposit: Glaciofluvial **Parish:** Blackville

Exposure Type: Gravel pit **NTS:** 21 I/13

Status: Inactive **UTM:** 859842

Section Description & Comments:

Approximately 4 m of crudely stratified, poorly sorted, cobbly pebble coarse sand. The deposit grades downwards into a sandy gravel. Texture estimate: 2 % cobbles, 15-20 % pebbles, occasional boulders (maximum size 35 cm); weathered sandstone present. Clasts are subrounded to rounded and slightly coated with silt. There is also a general silt content throughout the sediment.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
30	15	2	300,000

Location #: I13-28

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blackville

Exposure Type: Sand pit

NTS: 21 I/13

Status: Inactive

UTM: 848824

Section Description & Comments:

A thickness of 4 to 5 m of laminated, cross-bedded light beige, fine sand is exposed here.

See note for site I13-66 regarding deposit origin and form.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
Refer to I13-66		4.5	

Location #: I13-30 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blackville

Exposure Type: Gravel pit NTS: 21 I/13

Status: Active UTM: 801878

Section Description & Comments:

2 m of moderately sorted, stratified, medium sand and pebbly sand are exposed. Occasional cobbles and boulders are present in the exposure. The dominant gravel size is 25 mm. Clasts are subrounded to rounded.

Viewed from the bridge, most of this terrace appeared to be bedrock. Granular material is only capping it.

Recoverable reserves are limited by social factors (village).

D.O.T. data (1970) indicate a Los Angeles abrasion loss of 31.2 %. This deposit is recommended for borrow only.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	97.1	81.1	73.1	57.3	47.0	44.2	38.3	26.3	15.3	8.1	4.6
D.O.T. 1970	88.0		80.0	74.1	62.5			42.9			7.9
D.O.T. 1970	83.0		78.6	74.7	69.7			61.5			9.9

Lithologic Analysis:

Unsound Lithotypes (%) 24		Sound Lithotypes (%) 76	
Sandstone	22	Basic Igneous *	42
Sedimentary	2	Acid Igneous	16
		Sandstone	14
		Metasediment	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		2	

Location #: I13-31 County: Northumberland

Type of Deposit: Glaciofluvial terrace Parish: Blackville

Exposure Type: Sand pit NTS: 21 I/13

Status: Active on demand UTM: 821873

Section Description & Comments:

Approximately 3-4 m of laminated fine sand are exposed. No fines are evident. (Sample A).

Another exposure was observed 50 m to the southwest. It represents approximately a depth of 4 to 7 m; in relation with the above exposure it is the bottom of the terrace. It consists of moderately sorted, pebbly coarse sand. (Sample B).

Reserves are calculated only for a limited area around the pit, for the fine sand deposit.

Mechanical Analysis:

Sieve		1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	A						99.98	99.88	98.8	39.5	4.3	1.0
	B		94.5	87.2	71.7	57.4	51.4	40.9	27.2	10.0		

Lithologic Analysis:

Unsound Lithotypes (%) 30		Sound Lithotypes (%) 70	
Sandstone	24	Basic Igneous *	28
Acid Igneous	6	Acid Igneous	22
		Metasediment	8
		Quartz	2
		Sandstone	6
		Quartzite	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
4 (see also I13-37)	1.3 (fine sand)	3.5	45,000

Location #: I13-32

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blackville

Exposure Type: Borrow pit

NTS: 21 I/13

Status: Abandoned

UTM: 791885

Section Description & Comments:

0 - 1.0 m Moderately sorted, pebbly medium sand. Clasts are subrounded to rounded. Trace amount of cobbles.

1.0 - 7.0 m Slump covered.

D.O.T. data (1967) indicate a Los Angeles abrasion loss of 25.9 %. This deposit is recommended as a source from which can be produced ½" and 3/4" cover aggregate and 1¼" crushed base course aggregate.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	86.6	72.1	61.6	47.3	40.0	36.7	29.2	10.3	2.3	1.1	0.8
D.O.T. 1967	64.0		55.6	48.5	33.7			15.0			2.7
D.O.T. 1967	79.0		69.4	60.5	43.6			16.2			1.5

Lithologic Analysis:

Unsound Lithotypes (%)	26	Sound Lithotypes (%)	74
Sandstone	24	Basic Igneous *	30
Sedimentary	2	Sandstone	18
		Acid Igneous	22
		Quartz	2
		Quartzite	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
11	11	4	450,000

Location #: I13-33 County: Northumberland

Type of Deposit: Alluvium Parish: Blackville

Exposure Type: Gravel pit NTS: 21 I/13

Status: Inactive UTM: 834869

Section Description & Comments:

3.5 m of crudely stratified, moderately to poorly sorted sandy pebble gravel is exposed. The dominant pebble size is 1 cm. The top bed shows 0.6 m of poorly sorted cobbly (2%) sandy fine pebble gravel. The next 0.5 m appears moderately sorted as the cobbles are present in trace amounts; sand content increases downwards.

Another exposure of sandy fine pebble gravel was observed one-half kilometre to the east, part of this same alluvial terrace.

D.O.T. data (1960) indicate a Los Angeles abrasion loss of 22.9 to 24.1 %. This deposit is recommended for cover material.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											
D.O.T. 1960	70.0		54.6		31.3			8.5			0.5
D.O.T. 1960	70.0		59.4		34.7			11.1			0.5

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
7.5	4	2-3	90,000

Location #: I13-34

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blackville

Exposure Type: Terrace side, sand pit

NTS: 21 I/13

Status: Inactive

UTM: 799882

Section Description & Comments:

Approximately 18 m of laminated fine sand, dipping slightly towards the northeast are exposed. Presence of fines is suspected.

If the fines content is found to be above acceptable levels, then the potential usefulness of this deposit could be very limited and the reserve figure shown below very excessive.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
5.6	5.6	18	1,000,000

Location #: I13-35 County: Northumberland

Type of Deposit: Alluvium Parish: Blackville

Exposure Type: Borrow pit NTS: 21 I/13

Status: Abandoned UTM: 779882

Section Description & Comments:

1 m of moderately to poorly sorted, interstratified, medium sand and sandy pebble gravel is exposed. Clasts are subrounded. Bed thickness averages 10 cm. The next metre is slump covered.

This deposit has been heavily worked.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		2	Limited (see comments in I13-36)

Location #: I13-36 County: Northumberland

Type of Deposit: Alluvuim Parish: Blackville

Exposure Type: Gravel pit NTS: 21 I/13

Status: Active UTM: 768877

Section Description & Comments:

Approximately 2 m of moderately to poorly sorted sandy gravels are exposed. Clasts are subrounded, their maximum size is 8 cm. Average pebble size is 2.5 cm, average cobble size is 5 cm (3% total count).

This exposure is very oxidized to a depth of 0.6 m, it was also intensely reworked by bulldozers. Water table is high.

This pit is nearing depletion: however, additional materials might be exploited to the NE of this pit and SE of the highway.

D.O.T. data (1960) indicate a Los Angeles abrasion loss of 24.6% to 27.6%.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											
D.O.T. 1960	87.0		71.7		43.0			14.3			0.5
D.O.T. 1960	83.0		70.7		44.3			19.8			0.7

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
70	40	1	500,000

Location #: I13-37

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blackville

Exposure Type: Gravel pit

NTS: 21 I/13

Status: Inactive

UTM: 818872

Section Description & Comments:

4 m of moderately sorted, interstratified, cobble gravel, pebble gravel, medium sand and fine sand are exposed. The thickness of the gravel strata ranges between 0.3 m and 1 m. Beds dip towards the west, undulating.

Presence of fines is suspected.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
7	7	4	280,000

Location #: I13-38

County: Northumberland

Type of Deposit: Alluvium

Parish: Blackville

Exposure Type: Borrow pit

NTS: 21 I/13

Status: Abandoned

UTM: 825873

Section Description & Comments:

2 m of moderately sorted, gravelly medium sand are exposed. Texture estimate: 2% cobble, 15-20% pebbles (3 cm). Clasts are sub-rounded.

This deposit has already been heavily worked.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
20.2	19	1.5-2	323,000

Location #: I13-40

County: Northumberland

Type of Deposit: Ice-contact

Parish: Derby

Exposure Type: Borrow pit

NTS: 21 I/13

Status: Inactive

UTM: 868925

Section Description & Comments:

South face

0 - 1.5 m Crudely stratified, moderately to poorly sorted coarse sand, pebbly coarse sand and cobbly pebble gravel. Silt content is quite important. Clasts are coated with it, and are mainly subrounded. The maximum clast size is 25 cm.

North face

0 - 0.3 m Fine sand.
0.3 - 0.4 m Dark brown clay.
0.4 - 4.0 m Till; silty coarse sand matrix is quite abundant. Pebble content is approximately 15%. Clasts are subangular to subrounded.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
			Minimal

Location #: I13-41 County: Northumberland

Type of Deposit: Glaciofluvial blanket and veneer Parish: Blackville

Exposure Type: Dughole NTS: 21 I/13

Status: Undeveloped UTM: 852873

Section Description & Comments:

A terrace of 8 m height is present, however the depth of granular material could not be determined. A hole was dug to a depth of 1 m exposing fine sand with a trace amount of pebbles and cobbles. Clasts are subrounded. This is possibly a marine veneer and blanket. Further investigations should be conducted in order to determine the actual thickness of the deposit. Reserves indicated are minimum figures.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
100	60	1	500,000

Location #: I13-42

County: Northumberland

Type of Deposit: Alluvial

Parish: Blackville

Exposure Type: Gravel pit

NTS: 21 I/13

Status: Abandoned

UTM: 779899

Section Description & Comments:

2.5 m of moderately sorted, crudely stratified, medium to coarse sand are exposed. Clasts are subrounded. Fines content is quite important as well as the presence of unsound lithotypes.

A pond is filling part of the borrow pit.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	97.4	85.4	74.9	58.2	47.9	44.8	39.4	25.8	11.4	9.2	8.7

Lithologic Analysis:

Unsound Lithotypes (%) 34		Sound Lithotypes (%) 66	
Sandstone	24	Metasediment	8
Acid Igneous	8	Acid Igneous	30
Siltstone	2	Basic Igneous*	26
		Quartz	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
20	16	2	300,000

Location #: I13-43 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blackville

Exposure Type: Borrow pit NTS: 21 I/13

Status: Abandoned UTM: 733900

Section Description & Comments:

2.5 m of moderately sorted, stratified gravelly medium sand grading to a gravelly coarse sand are exposed. Dominant pebble size is 2 cm; maximum clast size is 7 cm. Clasts are subrounded.

Additional reserves may be available north of the area that was included in the calculations, but the deposit is thinner and not so easily defined.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
7.4	1.2	2.5	30,000

Location #: I13-45 County: Northumberland

Type of Deposit: Alluvium Parish: Southesk

Exposure Type: Trench NTS: 21 I/13

Status: Undeveloped UTM: 751005

Section Description & Comments:

A thickness of 1 m of very poorly sorted, sandy cobbly pebble gravel is exposed. Cobbles are quite abundant. Dominant pebble size is 3 cm and maximum clast size is 15 cm. Clasts are subangular to subrounded.

The presence of small streams running throughout this alluvial terrace presents serious limitations to its exploitation.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
150	120	1	1,000,000

Location #: I13-46 County: Northumberland

Type of Deposit: Ice contact - kame terrace Parish: Southesk

Exposure Type: Borrow pit NTS: 21 I/13

Status: Inactive UTM: 774011

Section Description & Comments:

Approximately 6 m of poorly sorted, crudely stratified, cobbly pebbly medium sand are exposed. Texture estimate: 2% cobbles, 20% pebbles.

Most of this deposit is already being used for housing, highway, etc. Minimal reserves are available for exploitation.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
30	Minimal	6	Minimal

Location #: I13-47 County: Northumberland

Type of Deposit: Alluvium Parish: Southesk

Exposure Type: River cut NTS: 21 I/13

Status: Undeveloped UTM: 797024

Section Description & Comments:

0 - 0.5 m Overburden, silty oxidized gravelly sand.
0.5 - 1.0 m Massive, moderately sorted cobbly pebbly medium sand. Cobble content is 5%. Their maximum size is 13 cm.

Reserves are limited by the residential development of the area.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	94.9	75.2	67.0	47.8	37.8	36.5	32.3	15.5	2.5	1.0	0.8

Lithologic Analysis:

Unsound Lithotypes (%) 4		Sound Lithotypes (%) 96	
Sandstone	2	Acid Igneous	50
Acid Igneous	2	Basic Igneous*	24
		Metasediment	16
		Quartz	4
		Sandstone	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
50	Minimal	6	Minimal

Location #: I13-48

County: Northumberland

Type of Deposit: Alluvium

Parish: Southesk

Exposure Type: Borrow pit (local)

NTS: 21 I/13

Status: Abandoned

UTM: 821049

Section Description & Comments:

A thickness of 2 m of moderately sorted, interstratified, medium sand and pebbly medium sand is exposed. Cobbles are occasional and the maximum clast size is 10 cm. Clasts are subangular to subrounded.

A nearby public park limits the exploitation of this deposit in the immediate vicinity; however, additional reserves might be exploited to the east.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
90	60	2-3	1,000,000

Location #: I13-49 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Southesk

Exposure Type: Sand pit NTS: 21 I/13

Status: Inactive UTM: 845045

Section Description & Comments:

7 m of laminated to stratified medium sand with fine sand and silt are exposed. The dip is toward southeast to east.

Reserves calculation includes the northward adjacent terrace.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
13.7	10	6	600,000

Location #: I13-56

County: Northumberland

Type of Deposit: Glaciofluvial blanket

Parish: Northesk

Exposure Type: Trench

NTS: 21 I/13

Status: Undeveloped

UTM: 848075

Section Description & Comments:

Approximately 1.5 m of stratified, moderately sorted, medium sand and pebbly fine to medium sand is exposed.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
20	15	1.5	150,000

Location #: I13-57 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Northesk

Exposure Type: Sand pit NTS: 21 I/13

Status: Inactive UTM: 837048

Section Description & Comments:

3.5 m of laminated to stratified, well sorted, medium sand and silty fine sand are exposed. Laminations dip towards the northeast.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
79	70	3.5	2,400,000

Location #: I13-58

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Northesk

Exposure Type: Gravel pit

NTS: 21 I/13

Status: Inactive

UTM: 839082

Section Description & Comments:

Upper exposure

0 - 0.5 m Oxidized sandy gravel.
1 - 1.5 m Crudely interstratified, moderately to poorly sorted, gravelly medium sand and sandy fine pebble gravel. Trace amount of cobbles. Clasts are subangular to subrounded.
1.5 - 5.0 m Slump covered.

Bottom exposure

5.0 - 7.0 m Interstratified, moderately to poorly sorted, medium to coarse sand with gravelly coarse sand. Clasts mainly subrounded.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	98.6	89.9	87.7	61.8	43.1	39.4	33.1	19.6	6.9	1.6	0.9

Lithologic Analysis:

Unsound Lithotypes (%) 6		Sound Lithotypes (%) 94	
Acid Igneous	4	Acid Igneous	28
Sandstone	2	Basic Igneous*	32
		Metasediment	14
		Quartzite	8
		Quartz	12

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
25	15	5-7	750,000

Location #: I13-59

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Northesk

Exposure Type: Road cut

NTS: 21 I/13

Status: Undeveloped

UTM: 833065

Section Description & Comments:

2.5 m moderately-well sorted, medium sand are exposed.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
60	50	2.5	1,000,000

Location #: I13-60

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Northesk

Exposure Type: Borrow pit (local)

NTS: 21 I/13

Status: Inactive

UTM: 830060

Section Description & Comments:

4 m of laminated to stratified, fine sand and medium sand are exposed. The top meter and a half show a few beds 2 cm thick of reddish dark brown sandy silt.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
See I13-59			

Location #: I13-61 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Northesk

Exposure Type: Gravel pit NTS: 21 I/13

Status: Active UTM: 836046

Section Description & Comments:

6 m of poorly sorted interstratified medium sand and pebble gravel are exposed. The gravel texture ranges between 5 mm and 80 mm. Occasional cobbles were noticed. Clasts are subrounded.

D.O.T. data (1960) indicate a Los Angeles abrasion loss of 23.1 to 24.2%. This material can be recommended for use in portland cement concrete.

This deposit has been intensely worked in its central portion; however large additional reserves are still available for exploitation. Variations in texture might limit uses of this material.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing		97.8	95.1	86.2	79.1	76.2	71.2	50.6	6.4	3.0	2.6
D.O.T. 1960	71.0		58.4		32.6			10.0			0.7
D.O.T. 1960	89.0		70.1		47.9			14.1			0.9

Lithologic Analysis:

Unsound Lithotypes (%) 12		Sound Lithotypes (%) 88	
Sandstone	2	Acid Igneous	28
Acid Igneous	10	Metasediment	16
		Basic Igneous *	32
		Sandstone	6
		Quartz	2
		Quartzite	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
240	120	6	6,000,000

Location #: I13-62

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Northesk

Exposure Type: Borrow pit

NTS: 21 I/13

Status: Abandoned

UTM: 861025

Section Description & Comments:

Approximately 1.5 m of moderately sorted, interstratified, coarse sand and fine pebble sand is exposed. Pebble content is 10-15%. Maximum clast size is 3 cm.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		4.5	

Location #: I13-66 County: Northumberland

Type of Deposit: Glaciofluvial ridge Parish: Blackville

Exposure Type: Borrow pit NTS: 21 I/13

Status: Inactive UTM: 857851

Section Description & Comments:

0 - 1.5 m Interstratified, moderately well sorted, coarse sand and fine pebbly sand. Occasional cobbles and boulders. Clasts are subrounded.

1.5 - 6.0 m Slump covered.

Borehole results give a depth of 16 m of granular material, dominantly sand.

It is thought that this ridge is a remnant of a large outwash plain deposited by the Southwest Miramichi River during deglaciation prior to resuming or assuming its present channel. Reserve estimates have been calculated entire area of glaciofluvial ridge.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	98.1	95.3	91.1	79.7	64.0	55.0	35.1	12.5	3.6	2.0	1.4

Lithologic Analysis:

Unsound Lithotypes (%)		Sound Lithotypes (%)	
Sandstone	26	Quartz	4
Sedimentary	2	Acid Igneous	24
		Metasediment	18
		Sandstone	14
		Basic Igneous*	12

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
80	60	8-12	3,000,000

Location #: I13-67

County: Northumberland

Type of Deposit: Alluvium

Parish: Northesk

Exposure Type: Gravel pit

NTS: 21 I/13

Status: Abandoned

UTM: 841048

Section Description & Comments:

This site was intensely disturbed; a poor exposure was observed, showing 2 m of sandy pebble gravel to pebbly sand. Clasts are subrounded. Trace amount of cobbles.

This pit was exploited down to the water-table.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
31.5	16	2	320,000

Location #: I13-68

County: Northumberland

Type of Deposit: Glaciofluvial overlying Glaciolacustrine

Parish: Southesk

Exposure Type: Road cut

NTS: 21 I/13

Status: Undeveloped

UTM: 809042

Section Description & Comments:

0 - 1.5 m Interstratified, cross-bedded medium and coarse sand.
1.5 - 2.2 m Rhythmically banded very fine sand and silty clay.(Lacustrine?)

The presence of the underlying estuarine clay deposit may be widespread and could pose problems in extraction techniques in the deposit.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
24	6	1	60,000

Location #: I13-69 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Southesk

Exposure Type: Gravel pit NTS: 21 I/13

Status: Active UTM: 781019

Section Description & Comments:

Upper terrace

0 - 0.6 m Soil development is taking place in a moderately to poorly sorted pebble coarse sand. Pebbles show wide range in size and are dominantly subrounded to rounded. Trace amount of cobbles.
0.6 - 1.3 m Medium sand grading to a coarser sand.
1.3 - 1.5 m Pebbly medium sand.

Lower terrace

0 - 1.2 m Crudely stratified, poorly sorted sandy cobbly pebble gravel.
1.2 - 1.4 m Moderately well sorted fine pebble gravel.
1.4 - 1.6 m Cobbly pebbly medium sand with odd sandy lenses.

Reserves are calculated only for a limited area around the pit. Population is concentrated in this area. Continuing housing construction could render an increasing proportion of the deposit not suitable for exploitation. As this material is of potentially high quality, rapid exploitation followed by rehabilitation is recommended.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	82.3	72.4	64.5	50.6	34.5	35.2	26.7	11.2	2.8	1.5	1.3

Lithologic Analysis:

Unsound Lithotypes (%) 4		Sound Lithotypes (%) 96	
Conglomerate	2	Acid Igneous	60
Acid Igneous	2	Metasediment	14
		Basic Igneous*	12
		Sandstone	6
		Quartz	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
Upper terrace	6.5	3	200,000
Lower terrace	3.1	1.5	45,500

Location #: I13-71

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Southesk

Exposure Type: Road cut

NTS: 21 I/13

Status: Undeveloped

UTM: 731980

Section Description & Comments:

Approximately 1 m of moderately sorted pebbly coarse sand, grading downwards into a medium sand is exposed. Clasts are subangular to subrounded.

Another road cut (600 m SW) shows 1 m of interstratified medium and coarse sand and 0.2m of cobbly pebbly sand. This is the eastward extent of the deposit described at sites J16-20 and J16-11. Further investigations should be conducted in order to determine exploitable thickness of this deposit. The reserve estimate is a minimum figure.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
320	320	1.5	4,800,000

Location #: I13-72 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Northesk

Exposure Type: River cut NTS: 21 I/13

Status: Undeveloped UTM: 874016

Section Description & Comments:

A thickness of 4 m of moderately well sorted, crudely interstratified, pebbly medium sand is exposed. Pebble content is approximately 30%.

Higher terraces are included in this unit. They contain a smaller size and lower content of pebbles.

Much of this area is developed residentially and some is under cultivation. No reserves are estimated as only those undeveloped areas near the river where the deposit thicknesses are greatest might be suitable for exploitation.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	90.0	76.6	67.1	48.7	38.9	35.9	32.4	20.2	3.0	0.6	0.4

Lithologic Analysis:

Unsound Lithotypes (%) 12		Sound Lithotypes (%) 88	
Acid Igneous	8	Acid Igneous	48
Sandstone	4	Basic Igneous*	16
		Quartzite	10
		Quartz	6
		Sandstone	4
		Metasediment	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
114	90	2 (Variable)	

Location #: I13-73

County: Northumberland

Type of Deposit: Alluvium

Parish: Southesk

Exposure Type: Gravel pit

NTS: 21 I/13

Status: Inactive

UTM: 743007

Section Description & Comments:

Approximately 3.5 m of massive, moderately sorted, pebbly coarse sand is exposed. Occasional cobbles were noticed.

Most of the reserves indicated lie to the SW of the described pit. The terrace broadens, but also contains old channels and a high water table which might limit exploitation.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	77.7	74.5	69.8	61.4	57.5	56.4	43.4	9.1	0.6	0.2	0.2

Lithologic Analysis:

Unsound Lithotypes (%)	Sound Lithotypes (%) 100	
	Basic Igneous*	32
	Acid Igneous	34
	Metasediment	26
	Quartz	4
	Quartzite	2
	Sandstone	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
150	120	3.5	4,000,000

Location #: I13-74 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blackville

Exposure Type: Gravel pit NTS: 21 I/13

Status: Abandoned UTM: 877867

Section Description & Comments:

Approximately 4 m of moderately to poorly sorted, massive, gravelly medium to coarse sand grading downwards into a pebbly medium to fine sand are exposed. Clasts are subangular to subrounded. Occasional boulders are present.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
5	5	4	150,000

Location #: I13-75 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blackville

Exposure Type: Road cut NTS: 21 I/13

Status: Undeveloped UTM: 759904

Section Description & Comments:

Approximately 3 m of moderately-well sorted, interstratified medium sand and coarse sand are exposed. Bed thickness averages 3 cm. This deposit grades downwards into a fine pebble sand.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
12	10	2	180,000

Location #: I13-76

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blackville

Exposure Type: Sand pit

NTS: 21 I/13

Status: Inactive

UTM: 772875

Section Description & Comments:

8 m of massive, fine to medium sands are exposed.

Reserve figures should be confirmed: investigations (drilling work) could be conducted to ascertain extent and quality of the deposit.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
12.5	12.5	6	750,000

Location #: I13-77

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blackville

Exposure Type: Sand pit

NTS: 21 I/13

Status: Abandoned

UTM: 854811

Section Description & Comments:

This pit is located on map sheet 21I/12, 100 m south of this location point but it is considered as representative of the general texture of this landform. The exposure shows 0.6 m of very poorly sorted, very fine silty sand, with occasional boulders, pebbles, and cobbles, followed by 4.5 m of interstratified fine sand with very fine sand. Cross-bedding and interfingering were observed.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
25 (within map area)	20	4	600,000

Location #: I13-78 County: Northumberland

Type of Deposit: Glaciofluvial blanket Parish: Northesk

Exposure Type: Road cut NTS: 21 I/13

Status: Undeveloped UTM: 847065

Section Description & Comments:

Approximately 2-3 m of massive, moderately sorted gravelly sand to sandy pebble gravel.

This site is non conductive to exploitation because of housing concentration in that area.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		2	

Location #: J9-02 County: Northumberland

Type of Deposit: Glaciofluvial blanket Parish: Blissfield

Exposure Type: Local borrow pit NTS: 21 J/9

Status: Abandoned UTM: 174682

Section Description & Comments:

0 - 0.3 m	Soil horizon (overburden)
0.3 - 0.6 m	Crudely stratified, moderately sorted, pebbly coarse sand with occasional cobbles. Maximum clast size is 13 cm.
0.6 - 1.6 m	Pebbly coarse sand. Clasts are subrounded to rounded, mainly flat.

This glaciofluvial blanket of 50 - 75 m wide borders the Bartholomew river. At the present, very poor road access does not allow any recovery from the deposits. It is also felt that they are of variable thickness within their boundaries. Reserve estimates are very tentative. They include all the glaciofluvial deposits shown along the Bartholomew River.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	96.8	93.1	88.1	75.9	61.8	48.8	26.7	6.6	1.4	0.9	0.8

Lithologic Analysis:

Unsound Lithotypes (%) 30		Sound Lithotypes (%) 70	
Sedimentary	2	Basic Igneous*	44
Sandstone	22	Acid Igneous	4
Acid Igneous	6	Metasediment	2
		Sandstone	18

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
27	25	1.5	350,000

Location #: J9-03

County: Northumberland

Type of Deposit: Ice contact - esker

Parish: Blissfield

Exposure Type: Gravel pit

NTS: 21 J/9

Status: Inactive

UTM: 168646

Section Description & Comments:

0 - 1.0 m Bouldery layer. Maximum clast size is 0.8 m.
1.0 - 6.0 m Massive, poorly sorted, cobbly pebble gravel with a silty coarse sand matrix. Texture estimate: 5 - 10 % boulders, 25 - 30 % cobbles, 30 % pebbles, 25 % sand.

With a height of 8 m, this portion of the esker is the most substantial. As most of the esker extends along a swampy area, with no road access, reserves were brought down to this readily accessible portion. An estimate of total reserves is also shown.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	51.9	44.6	39.2	28.9	20.9	19.4	14.7	9.0	6.1	4.4	3.7

Lithologic Analysis:

Unsound Lithotypes (%) 46		Sound Lithotypes (%) 54	
Sandstone	46	Sandstone	43
		Acid Igneous	2
		Metasediment	7
		Basic Igneous*	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
10 (readily accessible)	2.5	6	150,000 (easily exploited)
50 (total)	50	6	3,000,000 (total)

Location #: J9-04 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blissfield

Exposure Type: Borrow pit NTS: 21 J/9

Status: Inactive UTM: 280802

Section Description & Comments:

0 - 0.3 m Soil development, (overburden)
0.3 - 1.2 m Moderately to well sorted, interstratified small pebble gravel and pebbly medium to coarse sand.
Clasts are subrounded. Occasional small cobbles were noticed.
1.2 - 3.0 m Slump covered.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing		94.5	86.2	71.0	59.2	53.4	42.8	16.1	2.2	0.4	0.1

Lithologic Analysis:

Unsound Lithotypes (%) 8		Sound Lithotypes (%) 92	
Sedimentary	8	Basic Igneous	44
		Acid Igneous	40
		Sandstone	8

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
5.5	2	2-3	50,000

Location #: J9-07 **County:** Northumberland

Type of Deposit: Glaciofluvial **Parish:** Blissfield

Exposure Type: Gravel pit **NTS:** 21 J/9

Status: Active on demand **UTM:** 259806

Section Description & Comments:

0 - 2.0 m Moderately to well sorted, stratified grading, cobbly pebbly sand and pebbly coarse sand. Cobble content diminishes downwards; their maximum size is 7.5 cm.
2.0 - 4.0 m Moderately sorted, interstratified medium sand with cobbly pebbly sand and pebbly sand.
4.0 - 5.0 m Medium to fine sand.
5.0 m Water table.

Reserves are calculated for a limited area around the pit to a depth that includes the gravelly material. Substantial additional reserves may be found to the east of the pit area.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing		90.2	82.8	65.5	55.5	50.8	41.1	19.5	6.7	4.1	2.4

Lithologic Analysis:

Unsound Lithotypes (%) 2		Sound Lithotypes (%) 98	
Basic Igneous	2	Basic Igneous *	16
		Acid Igneous	78
		Sandstone	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
6.2	5	4	200,000

Location #: J9-08

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blissfield

Exposure Type: Gravel pit

NTS: 21 J/9

Status: Abandoned

UTM: 240791

Section Description & Comments:

Approximately 2.3 m of massive, moderately sorted, cobbly pebbly coarse sand are exposed. Small cobble content average 3%. Maximum clast size is 7.5 cm. Clasts are subrounded.

This deposit is surrounded by a swamp.

D.O.T. data (1976) indicate an abrasion loss of 23.5 to 25.0%. The material is recommended for borrow and subbase and it meets the physical requirements for asphaltic concrete.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											
D.O.T. 1976	96		87	79	68	60		22			0.9
	97		80	65	54	48		14			0.8

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
12	10	1.5	150,000

Location #: J9-09

County: Northumberland

Type of Deposit: Alluvium

Parish: Blissfield

Exposure Type: Borrow pit

NTS: 21 J/9

Status: Abandoned

UTM: 214776

Section Description & Comments:

0 - 0.3 m Soil horizon (overburden)
0.3 - 2.6 m Massive, moderately sorted, cobbly pebbly coarse sand. Cobble size ranges from 7 to 10 cm. Clasts are subrounded.

Glaciofluvial deposits of approx. 50 ha. south of the river might provide significant additional reserves depending on the thickness of the materials. A "ball park" figure of 300,000 m^3 may be present.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
20	14	2	280,000

Location #: J9-10

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blissfield

Exposure Type: Gravel pit

NTS: 21 J/9

Status: Inactive

UTM: 175762

Section Description & Comments:

5 m of massive, moderately to poorly sorted, cobbly pebbly coarse sand are exposed. Cobble size is from 7 to 13 cm. Texture estimate: 10-15 % cobbles, 30-40 % pebbles, 30-40 % sand.

Reserves are calculated only for a limited area around the pit; however, there may be significant additional reserves to the east and west. A very tentative estimate for this latter area is 750,000 m^3.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
20	9	3	270,000

Location #: J9-11

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blissfield

Exposure Type: Gravel pit

NTS: 21 J/9

Status: Abandoned

UTM: 128735

Section Description & Comments:

Approximately 1.5 m of moderately sorted, cobbly pebbly coarse sand are exposed. Cobble content is 20 %, maximum clast size: 13 cm.

A very high water table limits exploitation of this terrace to 1.5 m depth; however, techniques such as draining and draglining might significantly increase the amount of material that could be exploited.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
22	22	1.5	330,000

Location #: J9-12 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Ludlow

Exposure Type: Borrow pit NTS: 21 J/9

Status: Abandoned UTM: 086718

Section Description & Comments:

1.5 m of massive, moderately sorted, cobbly pebbly medium sand are exposed. Clasts are subrounded to rounded. Texture estimate: 30 % cobbles, 25 % pebbles.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
10	6	1.5	90,000

Location #: J9-14

County: Northumberland

Type of Deposit: Ablation till

Parish: Ludlow

Exposure Type: Borrow pit

NTS: 21 J/9

Status: Abandoned

UTM: 991732

Section Description & Comments:

4 m of pebble gravel with a clayey silt matrix are exposed. Clasts are angular to subangular.

This deposit and others which can be expected in the area are suitable only for general borrow only and in the context of this report are not considered a granular aggregate resource.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable

Location #: J9-17 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blissfield

Exposure Type: Gravel pit NTS: 21 J/9

Status: Inactive UTM: 172591

Section Description & Comments:

0 - 0.3 m Soil horizon (overburden)
0.3 - 2.0 m Interstratified, moderately to well sorted pebbly coarse sand and medium sand. Trace amount of cobbles. Clasts are subrounded to rounded.

Most of this area is under cultivation.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing		82.7	72.4	52.8	41.8	38.2	31.3	10.3	0.5	0.3	0.3

Lithologic Analysis:

Unsound Lithotypes (%) 26		Sound Lithotypes (%) 74	
Sandstone	26	Acid Igneous	44
		Metasediment	2
		Sandstone	12
		Basic Igneous *	16

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
12.5	12	2	200,000

Location #: J9-18 County: Northumberland

Type of Deposit: Alluvial terrace Parish: Blissfield

Exposure Type: Road cut NTS: 21 J/9

Status: Undeveloped UTM: 147600

Section Description & Comments:

0 - 0.6 m Soil development is taking place in a pebbly coarse sand.
0.6 - 1.6 m Fine sand grading downwards into a clayey fine sand.

No reserve estimation was made for this deposit because of its limited thickness (before reaching the water table), and the river proximity (environmental considerations).

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: na/

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		1	

Location #: J9-18 a

County: Northumberland

Type of Deposit: Alluvial terrace

Parish: Blissfield

Exposure Type: Road cut

NTS: 21 J/9

Status: Undeveloped

UTM: 160591

Section Description & Comments:

Approximately 0.6 m of massive, moderately to well sorted, sandy cobbly pebble gravel is exposed. Clasts are subrounded and coated with fines. Cobbles content 5-10 %.

This is part of the deposit described at J9-18 but located above 1 km to the SE.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable

Location #: J9-19

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Ludlow

Exposure Type: Sand pit

NTS: 21 J/9

Status: Inactive

UTM: 155586

Section Description & Comments:

A thickness of 2 m of laminated to interstratified, fine sand with medium sand and small pebble gravel is exposed. Some laminations tinted by iron oxide were observed throughout the exposure. Pebbles are subangular to subrounded.

The deposit grades downwards into a sandy gravel (55 % gravel) as described in J9-21. Reserves shown below do not include the gravel unit, which is included in the J9-21 reserve estimation.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
10	9	2-3	225,000

Location #: J9-21

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Ludlow

Exposure Type: Road cut and gravel pit

NTS: 21 J/9

Status: Inactive

UTM: 155580

Section Description & Comments:

6 m of massive moderately sorted sandy pebble gravel with occasional cobbles are exposed. Clasts are subrounded. The sand content averages 50 %.

This unit is representative and contiguous with the bottom unit described in J9-19.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	94.5	82.7	74.0	56.7	47.7	46.4	42.2	25.3	6.6	1.7	0.7

Lithologic Analysis:

Unsound Lithotypes (%) 22		Sound Lithotypes (%) 78	
Sedimentary	2	Basic Igneous*	22
Sandstone	16	Acid Igneous	34
Acid Igneous	4	Sandstone	14
		Metasediment	4
		Quartz	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
10	9	6	540,000

Location #: J9-22

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Ludlow

Exposure Type: Gravel pit

NTS: 21 J/9

Status: Inactive

UTM: 042654

Section Description & Comments:

2 m of crudely stratified, moderately to poorly sorted gravelly medium sand with occasional pebble gravel layers are exposed. Texture estimate: 30-40 % pebbles, 2-3 % cobbles, maximum size 25 cm.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	82.7	66.3	61.8	46.4	37.8	34.5	29.5	20.6	10.0	5.3	3.1

Lithologic Analysis:

Unsound Lithotypes (%) 22		Sound Lithotypes (%) 78	
Sandstone	22	Sandstone	18
		Basic Igneous*	52
		Metasediment	8

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
25	25	2	300,000

Location #: J9-23

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blissfield

Exposure Type: Borrow pit

NTS: 21 J/9

Status: Abandoned

UTM: 015647

Section Description & Comments:

2 m of massive, poorly sorted, gravelly coarse sand with occasional boulders are exposed. Abundant weathered sandstone clasts were observed. Pebbles are subangular to subrounded and coated with silt. High water table.

This deposit is of very poor quality. It is probably only suitable for fill.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
6	5	2	80,000

Location #: J9-28

County: Northumberland

Type of Deposit: Ice-contact

Parish: Blissfield

Exposure Type: Trench

NTS: 21 J/9

Status: Undeveloped

UTM: 237716

Section Description & Comments:

1.6 m of massive, moderately sorted, gravelly silty medium sand are exposed. Texture estimate: 7-10 % cobbles (average size 7.5 cm), 40-45 % pebbles. Clasts are subrounded, blade-like. Occasional weathered sandstone clasts were observed.

There is very poor access to this area; old trails are now partly overgrown. This is the only significant exposure observed in the area.

The ridged portions of this deposit will likely provide the bulk of the reserves indicated.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	84.4	71.7	61.9	47.1	40.3	37.6	31.6	16.4	7.3	4.7	3.2

Lithologic Analysis:

Unsound Lithotypes (%) 8		Sound Lithotypes (%) 96	
Sandstone	8	Sandstone	40
		Basic Igneous*	34
		Acid Igneous	10
		Metasediment	6
		Quartz	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
120	100	2-3	2,000,000

Location #: J9-29

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Ludlow

Exposure Type: Road cut

NTS: 21 J/9

Status: Undeveloped

UTM: 063713

Section Description & Comments:

1 m of massive, poorly sorted, bouldery cobbly pebbly medium sand is exposed.

This deposit is of very poor quality, it could probably be used only for local borrow purposes.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
75	75	1	500,000

Location #: J9-30 County: Northumberland

Type of Deposit: Glaciofluvial terrace Parish: Ludlow

Exposure Type: Gravel pit NTS: 21 J/9

Status: Abandoned UTM: 925751

Section Description & Comments:

2.5 m of poorly sorted cobbly gravelly sands are exposed. No stratification is apparent. Clasts are subrounded to rounded and dominantly of granitic lithology. Clasts are competent. Texture estimate: boulders 3% (largest 0.6 m), cobbles 10%, sand 60%, fines-trace.

In the large pit on the other side of the river, the percentage of sands increases while gravel and cobble content decreases. Boulders present are larger but fewer.

D.O.T. data (1972) indicate a Los Angeles abrasion loss of 24.0% and that the material is suitable for borrow, subbase and base course aggregate. The deposit contains sufficient oversize material to warrant a primary crusher.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	87.2	77.5	70.2	55.3	43.0	38.4	25.6	12.0	5.5	2.6	1.7
D.O.T. 1972	68.0		50.0	39.0	31.0	22.0		5.0			1.0
D.O.T. 1972	72.0		57.0	46.0	39.0	32.0		12.0			1.7

Lithologic Analysis:

Unsound Lithotypes (%)		Sound Lithotypes (%)	
Acid Igneous	12	Acid Igneous	58
		Basic Igneous *	30

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
50	10 (north of river and east of Bamford Brook)	2.5	250,000

Location #: J9-33

County: Northumberland

Type of Deposit: Ice Contact (esker)

Parish: Ludlow

Exposure Type: Gravel pit

NTS: 21 J/9W

Status: Active on demand.

UTM: 928616

Section Description & Comments:

An average of 8-10 m of poorly sorted, massive to crudely stratified dirty cobbly pebbly sand and cross-bedded sands and pebbly sands are exposed in this pit. Large clasts (cobbles and boulders) are subrounded and generally sound. Fine gravel is subrounded and often platey. Boulders 1%, cobbles 5%.

Approximately 400 m up the road, (site J9-33a), there are gravelly sands exposed in a small borrow pit. These are better sorted and appear to have fewer fines. Boulders and large cobbles are absent.

This deposit varies in thickness: highest point 12-13 m, lowest 5 m.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	65.7	56.3	52.1	42.3	33.7	18.3	7.5	3.0	1.1	0.6	0.5

Lithologic Analysis:

Unsound Lithotypes (%)		Sound Lithotypes (%)	
Sedimentary	10	Basic Igneous *	46
		Sandstone	8
		Metasediment	24
		Acid Igneous	12

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
75	70	8-10	6,300,000

Location #: J9-34

County: Northumberland

Type of Deposit: Glaciofluvial veneer and blanket

Parish: Ludlow

Exposure Type: Terrace side

NTS: 21 J/9

Status: Undeveloped

UTM: 130562

Section Description & Comments:

A hole was dug to a depth of 0.8 m showing a massive, well sorted medium sand with occasional pebbles. That terrace is 8-10 m high and the slope of its scarp is approximately 80°, tends to indicate that the terrace is formed of bedrock with only a granular veneer on the surface.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		0.5 - 1.5	Minimal

Location #: J9-35 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Ludlow

Exposure Type: Dughole, terrace side NTS: 21 J/9

Status: Undeveloped UTM: 101556

Section Description & Comments:

A hole was dug on the side of the terrace. 0.6 m of a cobbly pebble gravel was exposed. Clasts are subangular to subrounded, mainly flat. This exposure was still in the soil development horizon and roots limited any further digging.

This terrace is under cultivation.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
7.5	5.0	0.5	25,000

Location #: J9-36

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Ludlow

Exposure Type: Road cut

NTS: 21 J/9

Status: Undeveloped

UTM: 119554

Section Description & Comments:

2 m of moderately to well sorted interstratified, medium sand with pebbly medium sand are exposed. Occasional cobbles were noticed. Clasts are subangular to subrounded. Their maximum size is 12 cm. Strata thicknesses average 20 cm.

Another exposure was observed 50 m to the north, showing 2 to 3 m of a medium sand with occasional pebbles.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
See J9-37			

Location #: J9-37 **County:** Northumberland

Type of Deposit: Glaciofluvial **Parish:** Ludlow

Exposure Type: Sand pit **NTS:** 21 J/9

Status: Abandoned **UTM:** 128556

Section Description & Comments:

8 m of well sorted, interstratified medium sand and very silty fine sand are exposed. Iron oxide staining defines each bed. The beds average 7-8 cm in thickness.

Another exposure was observed, 100 m to the north showing 2 m of moderately sorted, crudely stratified fine pebble gravel with pebbly coarse sand. Occasional cobbles are present. Clasts are subrounded. This is probably the unit tested by the D.O.T.

D.O.T. data (1962) indicate a Los Angeles abrasion loss of 27.5 % and that the material is suitable for borrow, subbase and base course aggregate.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											
D.O.T. 1962	75.0		60.1	54.0	42.9			13.1			0.7

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
40	20	1.5	300,000

Location #: J9-38 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Ludlow

Exposure Type: Road cut NTS: 21 J/9

Status: Undeveloped UTM: 145571

Section Description & Comments:

1 m of massive, well sorted, gravelly coarse sand is exposed. Dominant texture is 2 mm.

This deposit extends within the Amostown development limits: no recoverable reserves.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	96.7	86.3	77.8	41.7	16.7	12.3	10.5	9.0	6.9	4.7	3.0

Lithologic Analysis:

Unsound Lithotypes (%)		Sound Lithotypes (%)	
Acid Igneous	8	Quartzite	4
Sandstone	50	Sandstone	4
Metasediment	2	Basic Igneous*	16
		Acid Igneous	12
		Metasediment	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable

Location #: J9-39 County: Northumberland

Type of Deposit: Ice-contact Parish: Blissfield

Exposure Type: Gravel pit NTS: 21 J/9

Status: Inactive UTM: 166580

Section Description & Comments:

0 - 1.0 m Moderately sorted cobbly pebbly medium sand (cobbles 5 %).
1.0 - 4.0 m This layer shows poor sorting with cobble content increasing to 10-15 % and occasional boulders. Laterally, interfingering or possible cross-beds were observed.

This exposure is 10-12 m high and is characterized by contorted beddings. Its general texture can be defined as an interstratified medium sand with poorly sorted sandy cobbly pebble gravel. The thickness of the sand layers averages 30 cm, the gravel 1 m. Black manganese oxide coats the clasts in places. Small lenses of sediment show a high silt content.

D.O.T. data (1963) indicate an abrasion loss of 37.4 % and that the material is suitable for borrow and borderline subbase.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											
D.O.T. 1963	74.0		64.3		51.5			25.4			5.5
D.O.T. 1963	76.0		60.4		36.2			20.7			7.4

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
6.25	3.8	8	300,000

Location #: J9-40

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blissfield

Exposure Type: Sand pit

NTS: 21 J/9

Status: Inactive

UTM: 193587

Section Description & Comments:

3 m of medium to fine sand with occasional pebbles are exposed.

This deposit, including locations J9-41 and J9-42 is within the limits of the village of Doaktown. Housing construction could render an increasing proportion of the deposit unexploitable.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
100	2	2.5	50,000

Location #: J9-41 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blissfield

Exposure Type: Gravel pit NTS: 21 J/9

Status: Inactive UTM: 196592

Section Description & Comments:

0 - 3.0 m Crudely stratified, moderately sorted, pebbly medium to coarse sand. Occasional cobbles are present. A flow direction towards the west is indicated by clast imbrication.

3.0 - 5.0 m Sand content increase downwards.

D.O.T. data (1962) indicate a Los Angeles abrasion loss of 34.4 % and that the material is suitable for borrow and as borderline run of pit subbase aggregate.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing		93.0	81.2	61.3	50.9	45.5	38.4	22.2	3.4	0.6	0.4
D.O.T. 1962	99.0		96.4	89.7	75.1			41.1			0.2
D.O.T. 1962	99.0		92.1	79.6	55.5			20.0			0.1

Lithologic Analysis:

Unsound Lithotypes (%) 32		Sound Lithotypes (%) 68	
Acid Igneous	14	Metasediment	4
Sandstone	18	Acid Igneous	38
		Basic Igneous *	24
		Sandstone	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
100	1	5	50,000

Location #: J9-42

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blissfield

Exposure Type: Borrow pit

NTS: 21 J/9

Status: Abandoned

UTM: 196596

Section Description & Comments:

3.5 m of moderately sorted interstratified gravelly medium sand and medium sand are exposed. The top metre shows coarser material with about 5% cobbles. Clasts are subrounded.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
100	1	3.5	Minimal

Location #: J9-46 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blissfield

Exposure Type: Borrow pit NTS: 21 J/9

Status: Inactive UTM: 276627

Section Description & Comments:

0 - 0.3 m Medium sand, occasional pebbles.
0.3 - 6.7 m Stratified, well sorted pebbly medium sand. Clasts are subrounded to rounded.

Mechanical Analysis:

Sieve	1¼"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing		97.0	88.2	57.9	44.2	39.2	34.7	22.1	2.1	0.7	0.6

Lithologic Analysis:

Unsound Lithotypes (%) 24		Sound Lithotypes (%) 76	
Acid Igneous	6	Acid Igneous	48
Conglomerate	2	Basic Igneous *	22
Sandstone	16	Metasediment	6

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
20	.4	5	20,000

Location #: J9-47

County: Northumberland

Type of Deposit: Ice-contact (esker)

Parish: Ludlow

Exposure Type: Borrow pit

NTS: 21 J/9

Status: Inactive

UTM: 013646

Section Description & Comments:

4 m of massive, poorly sorted, cobbly pebble gravel with occasional weathered sandstone boulders are exposed. Clasts are subangular and coated with silt. Bedrock is at the pit's floor.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
3.5	2.5	2-4	75,000

Location #: J9-49 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Ludlow

Exposure Type: Terrace scarp NTS: 21 J/9

Status: Undeveloped. UTM: 079535

Section Description & Comments:

Approximately 5 m of massive fine sand is exposed.

The adjacent alluvium is not considered exploitable due to the proximity of the Miramichi River.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
			Limited

Location #: J9-50

County: Northumberland

Type of Deposit: Ice-contact (esker)

Parish: Ludlow

Exposure Type: Borrow pit

NTS: 21 J/9

Status: Abandoned

UTM: 971643

Section Description & Comments:

This pit was not seen in the field; it was observed on aerial photographs. Located in the Bartholomew esker complex, the deposit could provide significant reserves of granular materials, however access to the deposit would require improvement.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
100	85	8 (estimated)	6,000,000

Location #: J9-51

County: Northumberland

Type of Deposit: Ice-contact

Parish: Ludlow

Exposure Type: Road cut

NTS: 21 J/9

Status: Undeveloped

UTM: 037666

Section Description & Comments:

A veneer of poorly sorted materials is exposed in the cut; however, aerial photographs show eskers extended to the west as part of this deposit. Reserve estimates are based on aerial photograph interpretation. This deposit is considered to be part of the Bartholomew esker system.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
80	80	4-6 (estimated)	3,000,000

Location #: J16-01 **County:** Northumberland

Type of Deposit: Glaciofluvial **Parish:** Southesk

Exposure Type: Road cut **NTS:** w1 J/16

Status: Undeveloped **UTM:** 278956

Section Description & Comments:

This road cut shows 2 m of medium sand with occasional pebbles.

This is a part of a large glaciofluvial deposit which is described further at sites J16-02, J16-11, J16-12, J16-20 and I13-71.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
See I13-71		2	

Location #: J16-02

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Southesk

Exposure Type: Dug hole

NTS: 21 J/16

Status: Undeveloped

UTM: 273948

Section Description & Comments:

A hole was dug to a depth of 1.3 m. The upper portion exposed shows a soil development in a cobbly fine pebble gravel. Most soil development (overburden) was 0.3 m, however some weathering to 1.0 m depth. The bottom of the hole shows pebbly coarse sand.

This deposit is a part of the large glaciofluvial deposit described at location I13-71 and J16-20.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	92.5	87.4	83.4	72.6	57.4	49.1	29.2	10.3	5.9	4.3	3.7

Lithologic Analysis:

Unsound Lithotypes (%) 6		Sound Lithotypes (%) 94	
Sedimentary	2	Basic Igneous*	24
Acid Igneous	4	Acid Igneous	34
		Andesite	2
		Quartz	6
		Sandstone	18
		Metasediment	10

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
300	25	3	750,000

Location #: J16-03

County: Northumberland

Type of Deposit: Alluvium

Parish: Southesk

Exposure Type: Borrow pit

NTS: 21 J/16

Status: Abandoned

UTM: 172976

Section Description & Comments:

A thickness of 2.5 m of poorly sorted, oxidized cobbly pebbly coarse sand is exposed. Texture estimate: 3% cobbles, 6-10% pebbles. Few boulders were noticed; their maximum size is 40 cm. Clasts are subrounded to rounded and coated with fines. This deposit is well compacted.

The reserve estimate includes locations J16-03 and J16-05. Confidence is low in the figures used in reserve calculation because of the proximity of Parks Brook, the Miramichi River and the road cutting across the deposit. Additional reserves of a similar quantity are located on the south side of the Little Southwest Miramichi River.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	66.9	58.3	52.2	40.8	33.0	30.7	22.4	17.7	9.1	3.5	2.1

Lithologic Analysis:

Unsound Lithotypes (%) 8		Sound Lithotypes (%) 92	
Acid Igneous	6	Acid Igneous	38
Sedimentary	2	Quartzite	8
		Metasediment	10
		Basic Igneous *	34
		Quartz	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
18	8.0	2.5	200,000

Location #: J16-04

County: Northumberland

Type of Deposit: Ablation till

Parish: Southesk

Exposure Type: Borrow pit

NTS: 21 J/16

Status: Abandoned

UTM: 136973

Section Description & Comments:

A thickness of 5 m of till is exposed. Its texture can be described as a cobbly pebble gravel with a silty coarse sand matric.

This material is suitable only for common borrow and not considered in the context of this report as a granular aggregate source.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		4	

Location #: J16-05

County: Northumberland

Type of Deposit: Alluvium

Parish: Southesk

Exposure Type: Gravel pit

NTS: 21 J/16

Status: Inactive

UTM: 176974

Section Description & Comments:

Approximately 3.5 m of moderately well sorted, crudely interstratified pebbly coarse sand and pebbly medium sand are exposed. Clasts are subrounded and coated with fines. Maximum clast size is 15 cm. (Trace amount of latter.)

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
			See J16-03

Location #: J16-06

County: Northumberland

Type of Deposit: Alluvium

Parish: Southesk

Exposure Type: Road cut

NTS: 21 J/16

Status: Undeveloped

UTM: 197961

Section Description & Comments:

A thickness of 2 m of moderately to poorly sorted, massive cobbly coarse pebble sand is exposed. Clasts are subrounded to rounded and their maximum size is 17 cm. There is about 1-2% cobbles.

Reserves are limited by the narrow width of the deposit, by the road which bisects it and by the proximity of the river.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis:

Unsound Lithotypes (%)	Sound Lithotypes (%)	
	Acid Igneous	52
	Basic Igneous*	30
	Metasediment	6
	Sandstone	2
	Quartz	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
			Limited

Location #: J16-07

County: Northumberland

Type of Deposit: Alluvium

Parish: Southesk

Exposure Type: Sand pit

NTS: 21 J/16

Status: Inactive

UTM: 209960

Section Description & Comments:

Approximately 3 m of massive, moderately sorted coarse sand are exposed. Texture estimate: 1% cobbles, 3-5% pebbles.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
10	10	3	300,000

Location #: J16-08

County: Northumberland

Type of Deposit: Alluvium

Parish: Southesk

Exposure Type: Gravel pit

NTS: 21 J/16

Status: Abandoned

UTM: 226968

Section Description & Comments:

A thickness of 2 m of moderately well sorted, pebbly medium sand is exposed. The average size of pebbles is 1.5 cm. Clasts are round.

This deposit is part of the alluvial materials found all along this section of The Southwest Miramichi River. Locations J16-03, J16-05 and J16-07 are also in the general context of this deposit.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	92.4	83.3	75.5	57.1	44.9	42.4	35.7	20.7	5.7	2.2	1.3

Lithologic Analysis:

Unsound Lithotypes (%)	Sound Lithotypes (%) 100
	Sandstone 8
	Acid Igneous 40
	Basic Igneous* 40
	Metasediment 6
	Quartz 4
	Quartzite 2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
10	10	2	200,000

Location #: J16-09 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Southesk

Exposure Type: Gravel pit NTS: 21 J/16

Status: Inactive UTM: 242970

Section Description & Comments:

Approximately 4 m of crudely stratified, moderately sorted cobbly pebble coarse sand are exposed. Clasts are subrounded, approximately 2% cobbles.

The materials are possibly associated with the large meltwater channel shown to the northeast of the pit.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: na/

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable

Location #: J16-10 County: Northumberland

Type of Deposit: Glaciofluvial terrace Parish: Southesk

Exposure Type: Road cut NTS: 21 J/16

Status: Undeveloped UTM: 364973

Section Description & Comments:

This road cut shows a 1 m soil horizon, highly oxidized, underlain by 50 cm of a massive coarse sand with occasional cobbles. Clasts are subrounded.

The general area shows a high water-table. The hole was dug in a local knoll; various thicknesses are expected throughout the deposit area. Draining and draglining the deposit may increase the amount of material available for exploitation.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	88.8	82.7	80.0	72.8	71.6	69.4	58.7	29.4	10.2	2.6	1.9

Lithologic Analysis:

Unsound Lithotypes (%) 8		Sound Lithotypes (%) 92	
Sedimentary	4	Acid Igneous	46
Acid Igneous	4	Basic Igneous*	26
		Quartzite	10
		Sandstone	2
		Quartz	2
		Metasediment	6

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
250	200	1-3	4,000,000

Location #: J16-11

County: Northumberland

Type of Deposit: Glaciofluvial terrace

Parish: Southesk

Exposure Type: Gravel pit

NTS: 21 J/16

Status: Inactive

UTM: 266950

Section Description & Comments:

A thickness of 2 m of crudely stratified, moderately to poorly sorted medium sand is exposed. Occasional pebbles and cobbles are seen; with increasing frequency with depth.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		2	See J16-20

Location #: J16-12

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Southesk

Exposure Type: Road cut

NTS: 21 J/16

Status: Undeveloped

UTM: 271953

Section Description & Comments:

This road cut exposes 1.3 m of the bottom of the terrace; it consists of a medium sand. As shown on the slumped materials of the exposure by the presence of pebbles and cobbles, the upper portion of this landform (6-10 m high) is a moderately sorted gravelly sand.

Because of the thick slump cover, the limit between the gravelly sand and the sand was not defined. The recoverable reserve value therefore gives only a general idea of the granular material available without use distinction.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
25	25	6	1,500,000

Location #: J16-13 County: Northumberland

Type of Deposit: Glaciofluvial terrace Parish: Southesk

Exposure Type: Sand pit NTS: 21 J/16

Status: Inactive UTM: 251957

Section Description & Comments:

An overburden thickness of 60 cm. is underlain by 1 m of medium sand with occasional cobbles and 2% pebbles. Clasts are sub-rounded and slightly coated with fines.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
25.	25	1.5	300,000

Location #: J16-14

County: Northumberland

Type of Deposit: Glaciofluvial blanket

Parish: Southesk

Exposure Type: Dughole

NTS: 21 J/16

Status: Undeveloped

UTM: 914015

Section Description & Comments:

The deposit consists of an uneven thickness of pebbly coarse sand with occasional cobbles. Much of the deposit area is covered by water (lakes and swamps) limiting its exploitability. An esker was observed following the general trend direction of the deposit but it is interupted by the lakes and brooks coursing over the deposit.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: na/

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
40	30	1-2	300,000

Location #: J16-15, J16-15a **County:** Northumberland

Type of Deposit: Ablation till **Parish:** Southesk

Exposure Type: Borrow pits **NTS:** 21 J/16

Status: Abandoned **UTM:** 113952

Section Description & Comments:

0 - 0.4 m Soil horizon (overburden)
0.4 - 1.3 m Very compact, massive, poorly sorted pebbly medium sand with silty very fine sand lenses (2-4 cm). Clasts are angular to subrounded and coated with silt. Few cobbles and boulders are present.

Another exposure (J16-15a) 100 m to the northwest shows:

0 - 0.5 m Interstratified very fine silty sand and medium sand.
0.5 - 1.2 m Very fine silty sand. Occasional boulders are present and pebble content is about 3%.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		2	

Location #: J16-16 County: Northumberland

Type of Deposit: Ice contact (esker) Parish: Southesk

Exposure Type: Borrow pit NTS: 21 J/16

Status: Abandoned UTM: 116944

Section Description & Comments:

0 - 0.3 m Soil horizon, soil development is taking place in a cobbly pebble sand.

0.3 - 1.3 m Crudely interstratified medium sand and cobbly pebbly medium sand. There are also beds of interstratified medium sand with silty very fine sand. Laminations and lenses of silt are present in the more gravelly beds. Contorted beds were observed.

1.3 - 3.3 m Till: The silty sand matrix is quite dominant. Boulders and cobbles were only occasionally noticed and pebble content represents 3%.

This is a very poor quality deposit.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		3.5	See J16-16a

Location #: J16-16 a

County: Northumberland

Type of Deposit: Ice contact (esker)

Parish: Southesk

Exposure Type: Borrow pit

NTS: 21 J/16

Status: Inactive

UTM: 118945

Section Description & Comments:

0 - 1.5 m Crudely stratified to lenticular, moderately to well sorted medium sand, fine sand and sandy fine pebble gravel. Occasional boulders and cobbles were noticed. Clasts are subangular to Subrounded.

1.5 - 3.5 m Slump covered

This location shows a very sharp lateral textural change with respect to J16-16.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	92.4	87.6	83.5	74.4	63.5	56.8	44.5	28.6	11.6	4.0	1.8

Lithologic Analysis:

Unsound Lithotypes (%) 6		Sound Lithotypes (%) 94	
Acid Igneous	4	Metasediment	26
Sedimentary	2	Acid Igneous	28
		Conglomerate	2
		Basic Igneous*	34
		Quartz	2
		Quartzite	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
30	20	3	600,000

Location #: J16-17 County: Northumberland

Type of Deposit: Ablation till Parish: Southesk

Exposure Type: Borrow pit NTS: 21 J/16

Status: Inactive UTM: 165929

Section Description & Comments:

This exposure shows 3 m of ablation till bisected by a 30 cm bed of medium sand. It is a massive, compact, cobbly pebble gravel with silty sand matrix. Clast are angular to subangular. Unsound clasts are scarce.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
		3	

Location #: J16-18 County: Northumberland

Type of Deposit: Alluvium Parish: Blissfield

Exposure Type: Gravel pit NTS: 21 J/16

Status: Inactive UTM: 208899

Section Description & Comments:

Approximately 7 m of massive, moderately well sorted sandy fine pebble gravel to coarse sand is exposed. Cobbles are scarce.

Reserves are calculated for the portion of the deposit north of the Renous Highway around the existing pit.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing		98.3	91.7	72.4	56.1	39.7	23.8	10.0	1.2	0.3	0.2

Lithologic Analysis:

Unsound Lithotypes (%) 4		Sound Lithotypes (%) 96	
Sandstone	4	Acid Igneous	46
		Basic Igneous*	30
		Quartzite	2
		Metasediment	12
		Feldspar	2
		Sandstone	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
24	10	6	600,000

Location #: J16-19 County: Northumberland

Type of Deposit: Alluvium Parish: Blissfield

Exposure Type: Gravel pit NTS: 21 J/16

Status: Inactive UTM: 226909

Section Description & Comments:

A thickness of 2 m of crudely stratified, moderately sorted, cobbly pebbly sand is exposed. Clasts are subrounded.

Toward the southeast, the deposit becomes discontinuous and the terrain is swampy. This pit has been worked extensively.

D.O.T. data (1963) indicate a Los Angeles abrasion loss of 22.8% and that the deposit could be used for subbase.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	82.8	74.6	67.6	52.3	44.9	36.8	28.0	12.4	3.8	1.7	1.0
D.O.T. 1963	75.0		65.8		37.9			9.6			0.7
D.O.T. 1963	70.0		64.0		37.2			15.3			0.8

Lithologic Analysis:

Unsound Lithotypes (%) 14		Sound Lithotypes (%) 86	
Acid Igneous	14	Basic Igneous *	32
		Acid Igneous	36
		Sandstone	8
		Metasediment	10

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
26	10	2	200,000

Location #: J16-20

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Blissfield

Exposure Type: Gravel pit

NTS: 21 J/16

Status: Inactive

UTM: 257926

Section Description & Comments:

This is a crudely stratified, moderately sorted, pebbly medium sand with occasional cobbles. Clasts are subrounded. Only 70 cm of this material is exposed and 2.3 m are slump covered.

Estimate of reserves, applies to the entire deposit, including areas described as J16-01, J16-11, J16-13. The boundary on the map defines the area workable; the deposit itself is substantially more extensive. The average thickness value is very conservative.

D.O.T. data (1967) indicate a Los Angeles abrasion loss of 20.9% and that the deposit is recommended for borrow or borderline subbase.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	86.1	70.1	62.4	48.2	41.8	40.7	35.8	18.9	8.7	4.7	2.3
D.O.T. 1967	90.0		82.0		69.5			13.0			0.4
D.O.T. 1967	71.0		63.8		48.6			15.5			1.0

Lithologic Analysis:

Unsound Lithotypes (%)	14	Sound Lithotypes (%)	86
Acid Igneous	12	Acid Igneous	48
Sandstone	2	Metasediment	2
		Basic Igneous *	22
		Quartzite	10
		Sandstone	4

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
300	300	3	8,000,000

Location #: J16-21 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blissfield

Exposure Type: Gravel pit NTS: 21 J/16

Status: Inactive UTM: 139861

Section Description & Comments:

0 - 0.6 m Soil horizon, soil development (overburden)
0.6 - 1.3 m Crudely stratified, moderately to well sorted, pebble gravel and pebbly medium sand. Beds are dipping towards the south.
1.3 - 5.0 m Slump covered, assumed to be gravel.

D.O.T. data (1969) indicate a Los Angeles abrasion loss of 20.5%. This deposit is recommended for borrow, subbase, and as a possible filter material. The deposit is very erratic and there is a high percentage of oversize up to 500 mm which is not reflected in the samples.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	97.1	86.6	81.2	55.6	37.5	30.3	21.4	12.9	5.5	2.2	1.3
D.O.T. 1967	80.0		73.3		50.7			11.8			1.6
D.O.T. 1967	71.0		62.4		41.8			9.4			1.3

Lithologic Analysis:

Unsound Lithotypes (%) 23		Sound Lithotypes (%) 77	
Sedimentary		Basic Igneous*	20
Acid Igneous		Acid Igneous	28
Sandstone		Metasediment	9
		Sandstone	18
		Quartz	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
6.0	6.0	5	300,000

Location #: J16-22

Type of Deposit: Alluvium

Exposure Type: Gravel pit

Status: Inactive

County: Northumberland

Parish: Blissfield

NTS: 21 J/16

UTM: 154863

Section Description & Comments:

0 - 0.6 m Soil horizon, clay enrichment in a cobbly pebbly coarse sand. Boulders are scarce and coarse cobbles represent 2-3 %.

0.6 - 1.2 m The cobbly pebbly coarse sand grades with depth into a more sandy deposit.

1.2 - 6.5 m Slump covered.

The present pit area has already been heavily worked. The remaining portion of the pit has a high water table. The deposit extends beyond the immediate pit area.

D.O.T. data (1975) indicate a Los Angeles abrasion loss of 21.8% to 23.5% and the deposit is recommended for borrow, subbase and base course (1½" crushed) aggregate.

Mechanical Analysis:

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing	76.3	57.6	48.2	34.5	25.5	21.9	16.8	10.0	4.7	2.2	1.2
D.O.T. 1975	72.0		56.0	43.0	34.0	27.0		9.0			1.8
D.O.T. 1975	68.0		52.0	41.0	32.0	25.0		8.0			1.3

Lithologic Analysis:

Unsound Lithotypes (%) 10		Sound Lithotypes (%) 90	
Metasediment	2	Basic Igneous*	32
Sedimentary	4	Acid Igneous	32
Acid Igneous	4	Metasediment	16
		Sandstone	8
		Quartz	2

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
120	100	5	5,000,000

Location #: J16-23 County: Northumberland

Type of Deposit: Alluvium Parish: Blissfield

Exposure Type: Gravel pit NTS: 21 J/16

Status: Inactive UTM: 173877

Section Description & Comments:

Approximately 2 m of moderately sorted, cobbly pebble gravel are exposed.

This pit area was intensely reworked by bulldozers, consequently poor exposures were observed.

The deposit extends further up and downstream from this location, where the potential exists for future development.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
80	75	2	1,500,000

Location #: J16-24 **County:** Northumberland

Type of Deposit: Ice-contact (kame) **Parish:** Blissfield

Exposure Type: Road cut **NTS:** 21 J/16

Status: Undeveloped **UTM:** 198893

Section Description & Comments:

0 - 0.4 m Oxidized very fine silty sand: soil horizon clay enriched (overburden).

0.4 - 8.0 m Moderately to well sorted, interstratified pebbly medium sand and medium sand. Clasts are subrounded.

With the thickness observed and the texture of the materials, the deposit is suitable for future exploitation.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
10	9	4	360,000

Location #: J16-25

County: Northumberland

Type of Deposit: Glaciofluvial

Parish: Southesk

Exposure Type: Borrow pit

NTS: 21 J/16

Status: Abandoned

UTM: 912004

Section Description & Comments:

0 - 0.5 m Overburden
0.5 - 2.5 m Fine to medium sand with scarce pebbles and cobbles. Clasts are subangular to subrounded.

The deposit is now nearing depletion.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
			Minimal

Location #: J16-26 County: Northumberland

Type of Deposit: Glaciofluvial Parish: Blissfield

Exposure Type: Road cut NTS: 21 J/16

Status: Undeveloped UTM: 212905

Section Description & Comments:

Approximately 2 m of massive, moderately sorted medium sand are exposed. Pebbles are scarce.

Mechanical Analysis: n/a

Sieve	1½"	1"	3/4"	3/8"	#4	8	16	30	50	100	200
% Passing											

Lithologic Analysis: n/a

Unsound Lithotypes (%)	Sound Lithotypes (%)

Estimation of Reserves:

Total deposit area (hectares)	Area workable (hectares)	Average thickness (meters)	Recoverable reserves (m^3) probable
26	20	1.5	300,000

APPENDIX 2

BORROW PITS IN FRACTURED AND WEATHERED BEDROCK

NTS: 21 I/13		NAME: Newcastle	
UTM	Location Number	Rock Type	Observations
998968 066030 095023 093020 083035 090065 089068 098072	I13-02 I13-05 I13-06 I13-07 I13-08 I13-09 I13-10 I13-11	Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone	2 m highly weathered sandstone. High water table; most pits are muddy or contain a small pond. Located on E side of Southwest Miramichi. I13-09, 10, 11 used for fill in the new housing development of Douglasfield.
090940 058805 066804 028874 056941	I13-13 I13-14 I13-15 I13-16 I13-17	Sandstone Sandstone Sandstone Sandstone Sandstone	Used for fill. East side of the Southwest Miramichi.
012013 986991 968968 970955 960946 874901 844817 860942	I13-18 I13-19 I13-20 I13-21 I13-22 I13-24 I13-29 I13-39	Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone	These pits are located along the west shore of the Southwest Miramichi in a populated area. Used for fill.
742991 988033 972034 932039 907026 895020 860036 943057 992042 018051	I13-44 I13-50 I13-51 I13-52 I13-53 I13-54 I13-55 I13-63 I13-64 I13-65	Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone Sandstone	These pits are principally located along the shores of the Northwest Miramichi and the Little Southwest Miramichi (North and Northwest area of the map sheet.) Used for fill, some is crushed for concrete aggregate.
739011	I13-70	Conglomerate	Highly weathered (1.5 m). Pebble conglomerate, hematized.

NTS: 21 J/9 NAME: Doaktown

UTM	Location Number	Rock Type	Observations
285791	J9-01	Sandstone	
285812	J9-05	Sandstone	
277808	J9-06	Sandstone	
049708	J9-13	Sandstone	
068703	J9-15	Sandstone	
099710	J9-16	Sandstone	
149582	J9-20	Sandstone	
034668	J9-24	Sandstone	Weathered to various depths 1 to 3 m.
002616	J9-25	Sandstone	
034604	J9-26	Sandstone	
061589	J9-27	Sandstone	
915738	J9-31	Shale	
914732	J9-32	Shale	
208589	J9-43	Sandstone	
241537	J9-44	Sandstone	
223602	J9-45	Sandstone	
053628	J9-48	Sandstone	

NTS: 21 J/16 NAME: McKendrick Lake

UTM	Location Number	Rock Type	Observations
094026	J16-27	Phyllite	
152014	J16-28	Shale	Borrow pits.
237016	J16-29	Phyllite	Used for fill, local use.
225018	J16-30	Phyllite	
031833	J16-31	Shale	
008828	J16-32	Shale	

MAPS NOT

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CARTES

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